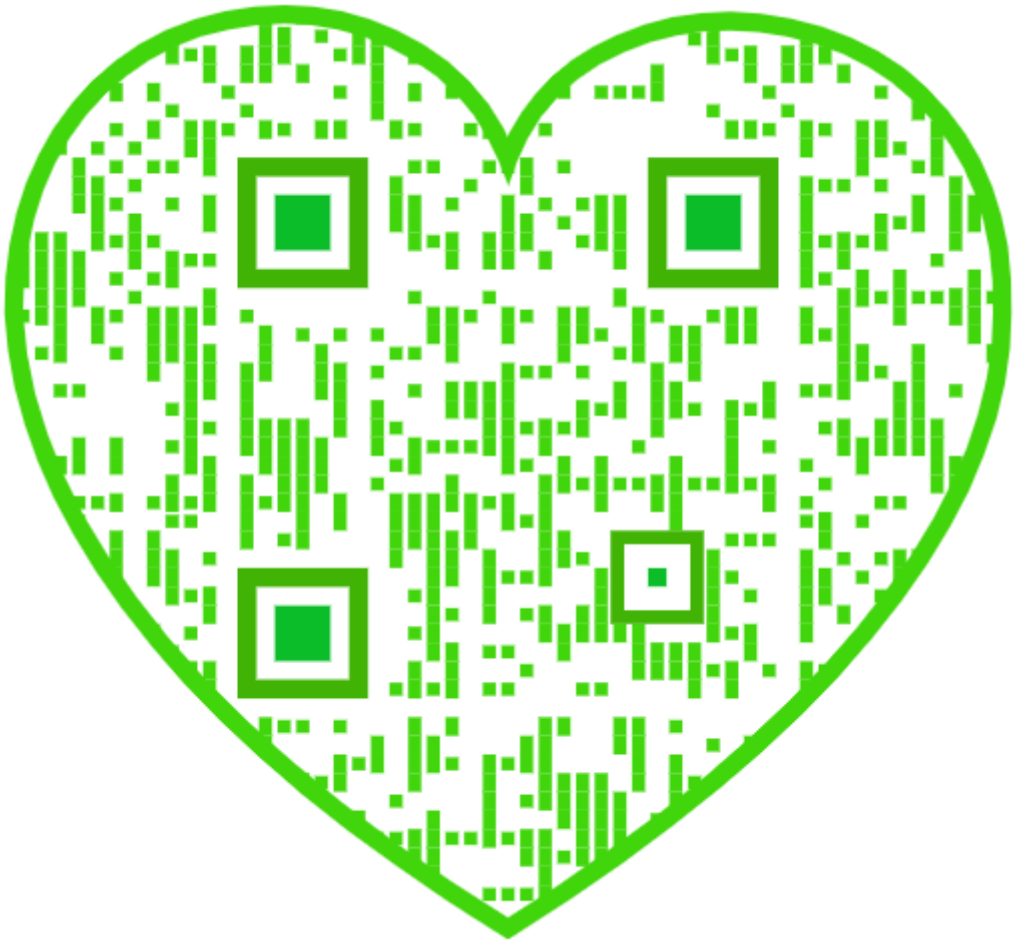

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HOW TO BUY AND HOW TO SELL,

INCLUDING CAREFUL AND ILLUSTRATED ANALYSES OF THE

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WITH ALL THE DISEASES TO WHICH THEY ARE SUBJECT, HOW TO KNOW THEM, THE CAUSES, PREVENTION AND CURE—GIVEN IN PLAIN, SIMPLE LANGUAGE, FREE FROM TECHNICALITIES, BUT SCIENTIFICALLY CORRECT, AND PRESCRIBING REMEDIES READILY OBTAINED AND EASILY APPLIED. DESIGNED FOR THE SUCCESSFUL AND PROFITABLE USE OF THE

AMERICAN FARMER AND STOCK OWNER,

BY

HON. JONATHAN PERIAM,

Editor "American Encyclopedia of Agriculture;" editor "Prairie Farmer;" former editor "Western Rural;" Member Illinois Department of Agriculture; First Superintendent of Agriculture Illinois Industrial University; Life-member American Pomological Society; Author "History Farmers' Movement," "Lesson for Life," &c., &c.

AND

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PUBLISHERS' PREFACE.

In presenting this volume to the public, the publishers feel especial pride. In authorship, it represents the unremitting labor of many years, and the facts are derived from long, practical experience, and thorough education in the line of its subjects. They believe that in it they present a volume of every-day, practical value, unequalled in the literature of this department of study. The completeness and scope, careful arrangement, and fulness of illustration, make it unique of its kind. Of its high scientific and literary merit, it is needless to speak. The simplicity in teaching and practice, and adaptability both to the ready comprehension and use of the ordinary farmer and stock owner, are equally apparent.

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With the exception of a few reprints of English books which are narrow in scope and design, poorly applying to the necessities of this country, there is not a similar work of reputable, competent authorship, covering the subjects embraced. Those of special pretentions are mere compilations by non-professionals, who assume professional titles, and thus impose upon the credulity, and trifle with the valuable interests, of the farmer and stock owner.

The full index, the plan and arrangement, the careful system throughout, are such that any fact in its contents can be readily found, so that, as a work of ready reference, as well as general study, it will be found especially convenient as well as reliable.

Impressed with the belief that it fills the all important requirement of *availability* for ready and unerring use, and that it is a thoroughly practical work—one that will serve the farmer as a valuable hand-book, both for study and constant reference, and which will enable him to turn the industry of stock breeding, raising, buying and selling to greater profit—it is respectfully submitted with the confident hope of approval.

AUTHORS' PREFACE.

This work is especially designed to supply the need of the busy American farmer and stock owner. It is somewhat remarkable that in this book-making age there is no well authenticated, systematic work accessible to the farmer in which the known facts and principles of the art of improving and breeding domestic animals, and of the causes, symptoms, prevention and cure of diseases, are presented in convenient form for study and reference. Yet such is the fact, notwithstanding the paramount importance of live stock to the farmer, and the wonderful progress that has been made in its improvement. The present effort to supply this want has been made in response to frequent solicitation, and especially suggested by oft repeated inquiries, received as journalists, for such a work covering safely the ground occupied by this volume. The importance of the subject cannot well be overestimated when we consult statistics giving the millions of dollars invested in live stock, in this great country, and it becomes especially important, when we consider that the bulk of this immense value is distributed among those of minor wealth, as the farmer and small stock owner, who have no access to educated veterinary practitioners, and who are not fully informed as to the practical principles applicable to the most successful and profitable breeding, training and general care of domestic animals. In this volume the effort is made to furnish such facts in systematic form, thus enabling the farmer everywhere to turn the business of stock raising to more profitable account. Long experience and observation leads to the belief that a carefully arranged and classified work giving the facts in the art of breeding and general care of live stock, derived from the experience of the practical and most successful stock men, will be of incalculable benefit to every owner of domestic animals.

In the following pages the value of kind treatment has been urged with marked frequency, and the fact is mentioned with no apologetic intent. It is urged as a policy both humane and profitable. What can be done to improve the condition and advance the comfort of these true friends of humanity is in the interest of economy. There is a much needed reform in the breeding, care and treatment of domestic animals, and the endeavor is here made to direct the way and point out its advantages.

In treating of the various breeds of live stock, it has been the purpose to give the special characteristics, with the excellences and defects in

each, so that the reader may know exactly which will serve best his exact purpose. In this, partiality for any one has been avoided and an honest effort made to point out the adaptability of each to special purposes. This much needed information will enable the reader to select for special objects with unerring judgment. There has been an undeviating purpose to avoid the too common custom of advocating the claims of any one breed or class of breeders, at the expense of another, or in contradiction to correct statement. The method of advertising specialties, too common in such books, has been scrupulously avoided.

The authors have long been impressed with the almost universal want of ability to judge accurately of the value of a horse, cow, or other animal of the farm, as also of its particular features of excellence, from general appearance, manner and physical development. Yet this is susceptible of almost exact knowledge. Intelligent study of these, with proper information ought to enable any one to determine the characteristics of a horse or cow, and whether it is best adapted to the purpose for which it is wanted. Not only can the matter of physical constitution and adaptability to a specific purpose be determined, but it is also within the power of the intelligent observer to detect vicious habits, disease and unsoundness, by the same analytic observation. A special feature of this work has been to give this information in such clear, specific, and analytic form, both by written word and illustration, as to make any intelligent reader a good judge of the value and qualifications, so to speak, of any horse, cow or other domestic animal.

The age of an animal has an important bearing in estimating both value and use. To cover this point of vital interest we have, in the Horse and Cattle departments, introduced illustrated *Charts* giving the formation of the teeth at the various ages, accompanied by such explanation and instruction as will enable any one, by a little study and observation, to ascertain with almost perfect accuracy the ages of these animals at any period. The value of this knowledge cannot well be overestimated. With this information, and the ability to understand special characteristics and defects, instruction on which is herein given and illustrated in such careful detail, the arts of the *jockey* will be effectually provided against.

The subject of training has received elaborate consideration, and as the value of an animal depends greatly on the care and success with which it has been *trained*, it is believed that the attention given to it will be productive of valuable results.

In this, as in other departments, gentle and humane methods are advocated as the most satisfactory and effective. Allied to this, the directions and facts given concerning proper shelter, and convenience and economy in building, derived from personal experience running from

the primitive shelter of the prairies, thirty-five years ago, to the present elaborate and costly barn, are deemed of interest and value.

In the veterinary departments special effort has been made to give the *causes* producing disease, so that knowing the cause the disease may be obviated. Prevention is better than cure, and this fact is emphasized throughout the volume. Equal care has been observed in *describing* and giving *symptoms*, so that the reader may, with as unerring certainty as possible, know the nature of the disease, and hence *what to do*.

When the services of a skilled veterinary surgeon are required it has been candidly advised, and care has been taken to distinguish between popular treatment and that requiring scientific and skillful management.

In prescribing remedies, the effort has been to give those within the reach of the farmer—such as he can procure, prepare and easily administer. In like manner, unfamiliar words and technical phrases have been avoided as far as possible, consistent with scientific accuracy of statement. Clearness and conciseness of expression have been carefully consulted, and, to further conduce to a correct understanding, an elaborate glossary is appended thoroughly explanatory of the meaning of every word in the book not familiar to every day life.

In the attainment of clearness, the generous and prodigal liberality of the Publishers in illustrating, by accurate, well executed and striking engravings, every department and chapter of the work, deserves special mention. As aiding and strengthening the enforcement of fact, this feature, made at enormous outlay, is of a practical value impossible to exaggerate.

In conclusion, the hope is indulged that the farmer and stock raiser who will attentively read these pages, and reduce to practice the suggestions therein given, will find such increase of success, profit and pleasure in his noble calling as to justify his good opinion and unqualified endorsement. If so, the authors' purpose in writing this book will have been accomplished.

THE AUTHORS.

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THE STABLE YARD.

THE COURIER LITH. CO. BUFFALO, N.Y.

PART I.

THE HORSE.

HISTORY, MANAGEMENT AND CHARACTERISTICS OF THE VARIOUS BREEDS.

THE HORSE.

CHAPTER I.

HIS ANCIENT AND MODERN HISTORY.

CONNECTED WITH MAN FROM THE EARLIEST HISTORICAL PERIOD.——I. THE HORSE IN ANCIENT HISTORY.——II. THE HORSE IN CIVILIZATION.——III. PRESERVING BREEDS IN PURITY.——IV. THE WILD HORSES OF TO-DAY.——V. FOSSIL HORSES.——VI. HORSES OF ASIA.——VII. EUROPEAN HORSES.——VIII. ARTIFICIAL BREEDING AND DISEASES.——IX. OPINIONS RELATING TO BREEDING.——X. IN-BREEDING OF HORSES.—— XI. VALUE OF HEREDITARY CHARACTERISTICS.—— XII. A CAREFUL STUDY NECESSARY.——XIII. ABOUT OBJECT LESSONS.

The period when the horse was first subjected to the use of man, extends so far back beyond the origin of written history, that no mention is made by writers of the native country of this noble animal. That his native territory was the hill and plain regions of tropical or sub-tropical Asia, there is however little doubt, since it is in such regions, the world over, that this animal upon regaining his freedom, and becoming semi-wild, soonest multiplies into vast herds.

In none of the most ancient inscriptions is the horse found represented in a wild state, but always in connection with man. The fabulous stories of the centaur, a creature half human and half horse, arose from the imagination of those savage tribes, who were conquered by more enterprising and partly civilized foes, who had acquired the art of subjecting the horse to use. It is stated that a Thessalian tribe, the Lapithæ, first subjected the horse, and hence acquired the name. But the horse was known in a civilization far anterior to that of this Thessalian tribe, though no record is made of the horse in a wild state even by his earliest masters. Hence we infer that the horse was not a native of Egypt but was introduced from some other country into the civilization of that land, the earliest on record except that of China.

I. The Horse in Ancient History.

The first record made of the horse in sacred writings, is in the time of Joseph in Egypt, at which period the horse had been subjected to harness. At the time of the Exodus under Moses, the horse was extensively used in war. The Grecian mythological stories give accounts of the use of horses in war, particularly at the siege of Troy, but they seem to have been confined only to the use of heroes.

Coming down to the true historical period, we begin to find the use of horses quite universal, for pleasure as well as for war; and as civilization began to colonize the earth, the horse closely followed. Where the original

country of the horse really was matters little, except as an interesting fact, whether in Asia, or on the soil of Africa, to which his near relations, the Zebra and Quagga, are certainly indigenous. It is certain, however, that in Media and Persia, and the fertile plains of Thessaly and Thrace, on the great meadows of the Danube, in the Ukraine, on the banks of the Dnieper and the Don, and other of the great grazing grounds of Europe and Asia, the horse found congenial soil and early became semi-wild. So, after the conquest of America, transplanted here, he became semi-wild, and soon occupied vast tracts on both sides of the tropics, in countless herds.

II. The Horse in Civilization.

In extending civilization the horse has always occupied a place next to man, carrying him quickly and safely on long journeys, aiding him to explore new regions, or bearing him beyond the reach of savage foes. In the earlier stages of civilization, oxen tilled the fields, while sheep furnished clothing and food, until latterly the labors of tillage have been almost entirely transferred to the quicker and more intelligent horse. Among the nations which flourished between ancient and modern times, the Arabs seem to have regarded the horse with the greatest esteem and kindliness. Among no people were more care and attention bestowed in his breeding, and nowhere else was the horse so made the companion of man. Hence in no other country, from the seventh to the seventeenth century after Christ were horses found combining such high intelligence, with great speed and lasting endurance in travel. The Arabs were thus enabled to furnish the infusion of blood that has resulted in the English and American thoroughbred, that has stamped its measure of value upon nearly all the more highly prized of the modern sub-families of horses. Yet neither the English horse, nor the American horse, nor indeed the so-called wild horses of America, retain any characteristic of an aboriginal breed. They are, all of them, purely artificial in their breeding, or the descendants of horses artificially bred.

III. Preserving Breeds in Purity.

As among the Arabs, so among all the civilized nations of the earth, the great care is to preserve breeds in their purity. Hence pedigrees were established, first among the Arabs, and later for the English thoroughbred, while within the last thirty years stud-books are becoming common for the various valuable breeds of horses that have originated from time to time. Breeders are also beginning to understand the value of kind and careful treatment, as well as of careful training, in their influence upon hereditary traits. These things seem to be far better appreciated in America than in England. To the early and careful handling

of colts in this country, making them companion-servants, rather than machine-slaves, subjecting them to the rule of kindness, rather than the law of brute force, in short to training rather than to breaking, is due the docility of American horses, in contrast to the temper and stubborn acquiescence of English horses; and this we believe is coming more and more to be generally acknowledged.

IV. The Wild Horses of To-day.

Of the so-called wild horses of the various countries of the earth, we have the authority of Mungo Park for the fact that wild horses exist in great herds, in the country of Sudamar, far to the southward of the great desert of Sahara, and in all that district extending to Nubia and Upper Abyssinia, where there are fertile, well-watered, grassy plains, and partially wooded countries.

In northern Asia, and especially in southern Siberia, vast droves of wild horses are known to exist; and in all that great pasturable region inhabited by the Tartars, both in Russian Europe and Asia there are countless herds semi-wild. These Tartar horses are said to owe their origin to the cavalry steeds turned loose in 1657, at the siege of Azof. In Canada, and in the Falkland Islands horses released from control become wild and sustain themselves in that condition. It is stated that horses released from the dominion of Man, and gone wild, have been found in Hayti and Jamaica. The great pampas and other grassy plains of Central America, North and South of the equator, including the Empire of Brazil, and also in Mexico, Texas, California, and elsewhere in the southern portion of the great plains of the United States, once contained immense droves of wild horses, the progenitors of which, escaping from the Spanish conquerors of these countries, at length multiplied into countless numbers. At the present day however there are but few that are not claimed by proprietors except perhaps in some isolated regions near the Equator.

V. Fossil Horses.

The fossil remains of horses are not rare in America. These fossil remains, have also been found in Great Britain, in the oldest formation, and of such extreme antiquity as to have been contemporaneous with the elephant, rhinoceros, tiger and hyena, in Great Britain, and with the mammoth and other similar fossils in America. These classes of animals were entirely different from the animals of to-day, and the only means of marking the lapse of ages intervening since they lived, is the succession of geological formations, and changes that have since taken place, carrying to total extinction the series of animals that then, and subsequently, up to the advent of man, successively occupied the earth.

VI. Horses of Asia.

Aside from the modern breeds of Europe which will be treated of separately, the Arabian is the most celebrated and undoubtedly combines more good qualities than any other Asiatic breed.

In India there are many horses of more or less repute, the most valuable of which is said to be the Turco, a cross between the Turcoman, a breed of South Tartary, and the Persian horse. It seems to be a fine animal, as it is said to be stately in movement as it is beautiful in form, and tractable in disposition. With the exception of the Turcoman, or horse of South Tartary, the Tartar and Calmuck horses are small, and ill shaped. They have the reputation, like our Indian ponies, of being able to perform long journeys under heavy burdens, while subsisting on the most indifferent food.

The horses of China are also small with but little excellence in any point. Ill shaped and spiritless, they seem effete like their masters, who possessing the most ancient civilization of the earth, were slowly but surely retrograding, until they came into contact with the civilization of Europe.

In Turkestan there appear to be two distinct races of horses. One is described as being heavy-headed, ewe-necked, with long legs and weak bodies; while the other has high crests and long bodies with limbs of good bone and substance. In Bokhara, is a small, stout, shaggy breed of horses, with very long manes and tails; they are called Kussaks, and are considered excellent little animals.

VII. European Horses.

In the chapters devoted to special breeds, the more important will be treated of separately. We shall only notice here such as have no prominence among the celebrated sub-families of the horse.

The German States have horses noted chiefly as being large, well-formed and well-adapted to the purposes of heavy draft. Belgium and Holland also have breeds of horses large, strong and well-formed. The Flemish horses were at one time much valued in England for draft and heavy coach horses, and they undoubtedly form one of the principal elements in the pedigree of some of the more celebrated of the English horses.

The Hungarian horses are supposed to have the same general origin with the German horses. They are however lighter, more active, show more spirit and better action, which is probably due to a more recent infusion of oriental blood.

Italy has not as good horses now as formerly. Some of them however are large, handsome, spirited animals, which do good service in carriage

harness. The same may be said of the horses of Spain. The common use of mules, both under the saddle and in harness, is not conducive to careful breeding in horses, still in Spain there are many fine horses especially for saddle use; the pure blooded Spanish barb being elegant, sprightly and docile.

Norway, Sweden and Finland, have a hardy race of little horses, which run half wild in the woods. They have fairly good forms, and are active and spirited. The people, however, give themselves but little trouble in breeding them.

In Iceland the horses are still smaller, active, hardy fellows, who pick up a scanty living for themselves, when not at work. Their origin is attributed both to the Swedish horse and those of the Shetland Islands, and they have points of resemblance to both.

Thus it is seen that each country has its own peculiar breed of horses, the result of local peculiarities. The further we go North the more dwarfed they become until some of them are found but little, if any, larger than the best of the larger breeds of long wooled sheep. As we go South to the tropics the horses increase in size until we reach the middle region of the temperate zone, where the largest and heaviest, as well as the fleetest and most valuable are found. Continuing still further southward the horses begin again gradually to decrease in size until as we reach the tropics we find them but little larger than the animals we call pony-horses. They are moderately swift, and of the most enduring bottom.

The horses of Arabia have been celebrated in all modern times, and justly so, for the reason that owing to careful breeding and the kindest treatment, in connection with the most excellent training, they came to possess the perfection of form, united with great speed and endurance, and almost human intelligence. That careful and scientific breeding was understood and appreciated by the ancients is evidenced by the lines of the first lyric poet of the time of Augustus Cæsar, which we find translated freely, but pointedly as follows:

"The brave begotten are by the brave and good.
There is in steers, there is in horses' blood
The virtue of their sires. No timid dove
Springs from the coupled eagle's furious blood."

VIII. Artificial Breeding, and Diseases.

It is well known that wild animals like savage tribes are little subject to disease It is the artificial surroundings, and artificial living which produce diseases unknown in a state of nature. Hence, on the farm, animals are less susceptible to disease than in city stables, where the life of the horse is purely an artificial one, and where he must be dependent

upon man, even for the water he drinks. Unfortunately he is too often dependent upon ignorant and brutal "helpers" who, the moment the eye of the master is turned, shirk their duty and the animal suffers. Hence the absolute necessity that all large stables should possess in the person of the foreman a competent head, and one whose sympathies are with the helpless animals under his charge. Such a person will not only earn his wages fully, but will save largely to the owner every year by his constant watchfulness and care. Artificial breeding also gives rise to a number of diseases, peculiar in themselves, and which may only be guarded against by intelligent care. Among the most serious of these are abortion, and all that class of diseases incident to animals kept in confinement in large numbers, and which, with other diseases of domestic animals, will be treated of separately in appropriate departments of this work.

IX. Opinions Relating to Breeding.

In tracing the history of horses, and all that relates to their care and treatment, we shall find various opinions relating to breeding. The systems of in-and-in-breeding, and cross-breeding, each have intelligent and successful advocates. In-and-in-breeding may be defined as being the breeding together for generations, of closely related members of a family of animals. For fixing a breed and for perpetuating the special excellences sought, there is no doubt of the soundness of the practice. It is in this way and by careful selection of parents that all new breeds are established and fixed. What distinguishes the successful from the unsuccessful breeder, is the knowing, or not knowing, just how to select, how long to breed in, and in departing from the rule, so to select the new sire, that there may be no violent change of characteristics. For it is a well established fact that long-continued in-breeding reduces the constitutional vigor of the animal while it is fixing excellencies for perpetuation. Bakewell, Collins, Bates, Webb, and many other eminent breeders of modern times, have been most successful in this direction, with cattle and sheep. The modern breeds of swine, also, owe their chief excellencies to this system, though in them it is modified by more frequent infusions of far related blood, since swine are peculiarly liable to degeneration of the vital forces, scrofula, and other diseases, supposed to be due to too close inter-breeding of near relations.

X. In-Breeding of Horses.

In horses, in-and-in-breeding has never been practiced to the same extent as with cattle. The horse is bred chiefly for his muscular powers and endurance. To this is required to be added, beauty of form, and as supplementary to speed and endurance, great lung power and constitutional vigor. Hence, when a sire possesses these merits in an eminent

degree, he is eagerly sought far and wide. In the selection of mares, this vigor of constitution, combined with ample room for the development of the foal is sought. Hence the breeder seeks to breed to such sires as shall endow their foals with their own special characteristics, being careful only that the cross shall not be a violent one, such as might produce decided alterations of form from that previously had.

XI. Value of Hereditary Characteristics.

Intelligence, stamina, great muscular power, constitutional vigor, and absence of congenital or hereditary disability, must all be taken into account in selecting sires. If the blood of an animal has been subject to any hereditary disability, as consumption or other disease arising from weak lungs, or has shown a liability to form curbs, spavin or other bone disease, such an animal should be discarded. Intelligence is a hereditary characteristic of special families which should be carefully looked to. Here again we find that this quality may be steadily increased by careful training. This is especially noticable in dogs bred for a single purpose, as shepherd dogs, pointers, setters, retrievers, etc. The hereditary instinct becomes at length so strongly marked in them, that the young animal takes to its special task of its own volition, and before the age for regular training is reached. In like manner certain breeds of horses are noted for their wonderful intelligence, as are the Arab horses, owing to hundreds of years of careful breeding, and to the training imparted by the master, who is the friend and companion of his horse.

XII. A Careful Study Necessary.

To most surely and successfully compass all this, the breeder must carefully study the horse from various standpoints. He must be familiar with the anatomy, or bony structure, the muscular development, the vital organs, the organs of digestion, and the other viscera of the animal. Again, the outward conformation is of the utmost importance, since from this a fair indication of all the rest may be arrived at. The girth and the barrel will give a good indication of the heart, lungs and digestive apparatus. From the head, the intelligence and docility of the animal may be clearly established. The shoulders, the loin and the haunch will be the index to the muscular power, and the bone and sinew may be accurately estimated from a proper examination of the limbs by one who will carefully study the succeeding chapters.

XIII. About Object Lessons.

Object lessons, the delineation of a subject by charts, plates and figures, have come to be regarded as one of the most important factors in modern education. They bring to the eye exactly what a thing is, and

its precise location. Hence, there has been prepared for this work the most accurate illustrations of every subject upon which it treats. In connection with this, the plainest descriptions and explanations are given, avoiding, as much as possible, technical scientific terms. These, when used, are explained, so far as possible, and should be learned by reference to the glossary, since, now-a-days, they are coming to be more and more used in every-day life, and in all languages, where used, mean exactly one and the same thing.

If the latter part of this chapter has been somewhat discursive, it seemed necessary to a fair understanding of what is to be said in the succeeding ones. In the next chapter we take up the horse in the relation of the bones to the body. Its scientific name is Anatomy—short enough and comprehensive.

CHAPTER II.

ILLUSTRATING THE ANATOMY OF THE HORSE.

I. FRAME WORK THE INDEX OF VALUE.——II. MASTER THE DETAILS OF THE SKELETON.——III. DIVISION OF THE SEVERAL PARTS.——IV. COMPARATIVE ANATOMY OF MAN AND THE HORSE.——V. ANALYZING THE SKELETON.——VI. THE FOOT.——VII. THE HEAD AND NECK.——VIII. BONES AND MUSCLES OF THE FRONT LIMBS.——IX. THE HIND LIMBS.

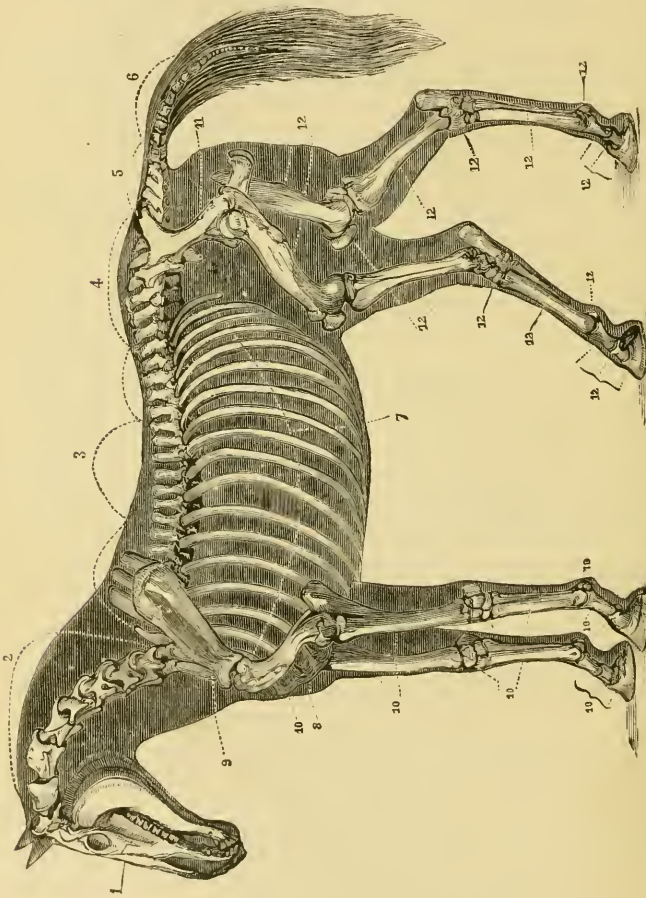
I. Frame Work the Index of Value.

A close and comprehensive study of the anatomy and physiology of the animals of the farm, is of the first importance to every person who breeds, rears, or buys them, with a view to profit from their sale. In the case of the horse it is especially necessary that this study be carefully made, since, in the perfection of the several parts, constituting solidity and fineness of bone, a firm and complete muscular development, large, healthy lungs, and the highest state of normal activity of the digestive organs, lies the real value of this most useful of the servants of man. The owner or purchaser must also know distinctly what an animal is intended for, and should select him with special reference to the service required, whether it be for special work, for trotting, racing, road-driving, light or heavy draft, or for what is termed general utility. With reference to these several uses the bony structure of the animal is of the first importance, since it is the skeleton upon which all else is built. Without a knowledge of the bones, the situation of the muscles cannot be accurately determined, or their actions, in connection with the several parts, to which they are attached, and especially their action on the limbs be definitely understood.

II. Master the Details of the Skeleton.

Hence we must first master the details of the bony structure. Next the muscles may be studied, and from this we may easily understand the minute but important action of the several parts as a whole. While the ordinary observer will be altogether misled, in estimating the value of an animal from his outward appearance and movements, he who has carefully studied the physical proportions with the eye of a careful anatomist will quickly and accurately understand the true value of the animal from the relation of the several parts one with another. For these habits of accurate observation will readily detect, in the living horse, the true character of the bony structure, and especially of the muscular system, which covers and envelops it. In order to make the bony structure plain to the reader it is here shown by

diagrams or object lessons, since this is the most graphic, and at the same time the most accurate, method of presenting information of this kind. To make our object lesson still more easy we give



CUT 1.—SKELETON SHOWN AGAINST OUTLINE OF LIVING HORSE.

in the engraving, not only the frame-work, but this resting on or shown against a back ground illustrating the outer form and contour of the horse.

The skeleton, as shown in the engraving, may be divided as follows: 1—Cranium, or Head. 2—Cervical vertebræ, or bones of the neck. 3—Dorsal vertebræ, or bones of the withers and back. 4—Lumbar vertebræ, or those of the loin between the false ribs and the upper edge of the Haunch Bone. 5—Sacral vertebræ, or those of the rump, or lying between the haunch bone and tail. 6—Caudal vertebræ, or bones of the tail. An observation of the dotted lines will show these correctly. 7—The Ribs, showing their correct position. 8—Sternum, or the breast bone. 9—Scapula, or shoulder bone. 10—The front limbs. 11—The Pelvis, the cavity of the body formed by the union of the haunch bones with those of the back and hip, and formed by the Sacrum at the top, the Ilium at the sides, the Ischium and the Pubis at the bottom. 12—The hind limbs.

III. Divisions of the Several Parts.

Thus we have given the entire skeleton of the horse, showing the bones as they appear in their natural positions and relations to each other. We next proceed to a more detailed study of the several parts.

The Head and Back Bones.—The head may be divided into two parts, the skull and the face, each having its particular bones, the variation of which may affect the proper grinding of the food and thereby influence the general condition of the animal, to say nothing of the relation between the shape of these bones and the horse's intelligence. The vertebræ are divided into five groups, of which the Cervical or neck, contains seven bones; the back, or Dorsal, eighteen; and the Lumbar, six. The Lumbar vertebræ really belong to the back, and added to the eighteen Dorsals, make a total of twenty-four. The Sacral vertebræ are five in number, and the Caudal fifteen, making a grand total of fifty-one vertebræ in the animal.

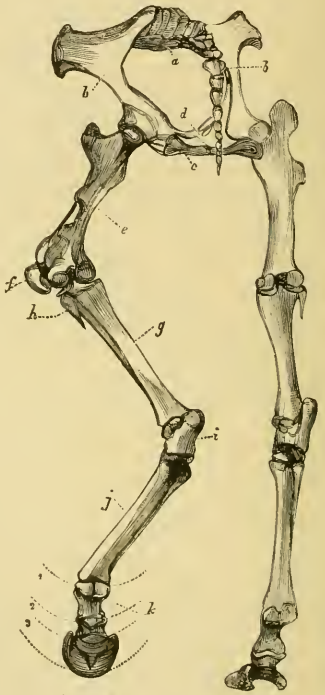
The Ribs.—The ribs are eighteen in number and are jointed to the transverse processes of the vertebræ, and curve, with some variations in their outline and direction, down to the sternum. Seven or eight of them are true ribs, and are composed of cartilage and attached to the breast bone and to the vertebræ, to allow full expansion of the lungs in breathing. Thus the spring of the ribs, as it is called, is most important to the horseman. The remaining ribs are called false ribs. They are not attached to the breast bone, but are united by cartilages, each on its own side, the union terminating in the sternum. Thus, all the ribs act in concert, giving play not only to the lungs, but also to other viscera.

The Sternum.—The Sternum, or breast bone, in the young horse, is composed of six bones, but in the full grown animal these become united into a single piece. The front of this bone is convex and sharply

keeled and its upper part projects so as to be plainly outlined in what is called the point of the breast, that part which the lower portion of the collar just covers.

The Hinder Limbs.—The Hinder Limbs are the propelling power of all animals, and especially so in the horse. Hence the haunches are strong and the upper portion is powerfully developed in muscle, and the lower correspondingly so in tendons. The illustration will give a perfect view, and the explanation the proper names of the parts.

The names and reference to the letters and figures are as follows: a, Sacrum; b, Ilium; c, Ischium. These bones constitute the Pelvis, as seen at a, d, c, and b, b. The other bones are: e, Femur; f, Patella; g, Tibia; h, Fibula; i, Tarsus; j, Metatarsus; k, Digit. The figures 1, 2, 3, refer to the Phalanges of the foot, corresponding to the toes in man.



CUT 2.—BONES OF HINDER PARTS.

The Haunch or Pelvis.—The Pelvis is made up of six bones, three on each side, all firmly united into one. The Ilium is strongly attached to the Sacral vertebræ, and may be called the keystone of the pelvic arch, while the lateral prolongations of the Ilium produce the prominences just above and in front of the hind-quarters. The Ischium or hip-bone is a backward continuation of the Ilium, and bears an enlargement which projects on each side a little below the tail. The pubis is a single bone and is connected with the others, forming an inverted arch with them, and composing the upper surface of the lower part of the pelvis.

IV. Comparative Anatomy of Man and the Horse.

The anatomy or bony structure of the horse is not so widely different from that of man as at first sight it would seem to be. Indeed, it was discovered by Aristotle in the days of the ancient Greeks that the horse, though a hoofed, and apparently a single-toed animal, actually has the

rudiments of toes enveloped in the flinty hoof which has developed around the foot and protects it from the rough soil over which the animal travels. And when a parallel is once found to exist even between the toes of the horse and those of man, there is nothing strange in the fact that other parts of the skeleton closely correspond. The names of the different portions of the limbs of the horse and of man are given below, in parallel lines, so the reader may see at a glance, those exactly corresponding, though called by different names. A reference to the skeleton proper, as given in the cut, page 46, will show the precise location of each of the bones mentioned in the horse.

Front Limbs.

MAN.		HORSE.
Arm (Humerus)	corresponds to the	Lower bone of shoulder.
Fore arm	" "	Arm.
Wrist (Carpus)	" "	Knee.
Hand (Metacarpus)	" "	Leg, cannon and splint bones.
Knuckles	" "	Fetlock.
Finger	" "	Pasterns.

Hind Limbs.

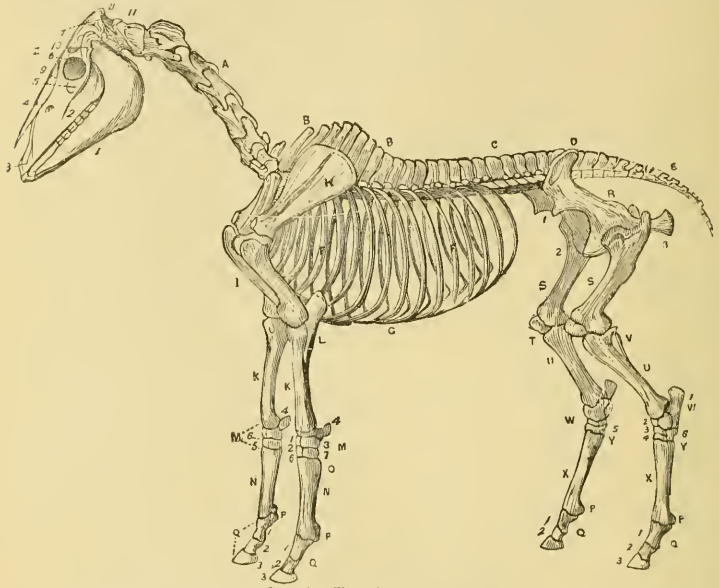
MAN.		HORSE.
Thigh (Femur)	corresponds to the	Upper bone of thigh.
Knee	" "	Stifle joint.
Leg	" "	Thigh.
Ankle (Tarsus)	" "	Hock.
Heel	" "	Point of hock.
Foot (Metatarsus)	" "	Leg.
Ball of Foot	" "	Fetlock.
Toe	" "	Pastern and foot.

This is quite different from the generally received idea of the comparative anatomy of man and the horse, and yet it is strictly true. This the skeleton will show, the proper names of each bone being given. The study is interesting, and the explanations will enable any one to fully understand the names and location of the parts.

V. Analyzing the Skeleton.

The bones of the spine, (vertebræ) have already been mentioned. The parts of the skeleton as shown in the next figure, are: A, Cervical Vertebræ; BB, Dorsal Vertebræ; C, Lumbar Vertebræ; D, Sacrum, the bone which forms the back part of the pelvis; E, Coccygeal bones, or those forming the tail: FF, Ribs; G, Costal cartilages, or the cartilages joining the ends of the ribs; H, the Scapula or shoulder blade; I, the Humerus, or the upper part of the fore leg; KK, the Radii, or outer bones of the fore legs, below the humerus and knee; L, the Ulva. This is the larger of the two bones of the upper part of the fore leg, lying behind the radius and extending from the knee to the lower part of the chest; M, the Knee, (Carpus). This is composed of 8 bones, viz:

1, Scaphoid, or boat shaped bone; 2, Semilunar, or bone resembling a half moon; 3, the Cuneiform, or wedge-shaped bone; 4, the Trapezium, resembling the geometrical figure of that name; 5, the Trapezoid, re-



CUT 3.—THE SKELETON.

sembling a trapezoid; 6, the great bone of the knee, (Os Magnum); 7, the Hook-shaped bone, (Unciform bone); 8, the pea-shaped bone, (pisiform bone); NN, the big bone of the fore leg, the cannon bone or large metacarpal; O, Splint bone, or small metacarpal; PP, Sessamoid bones—two small bones in the substance of the tendons, where the fore leg is joined to the ankle; QQ, Phalanges. These are: 1, the upper pastern bone; 2, lower pastern bone; 3, the first bone in the leg, (os pedis), inside the hoof, the coffin bone, and the navicular or ship-shaped bone, not marked here.

The Hinder Parts.—Coming to the hinder parts, R shows the pelvis. This is formed by: 1, the Hinm or flank bone; 2, the Pubis, or fore part of one of the bones of the pelvis; 3, the Ischium, or hinder and lower part of the hip bone. S, the Femur or thigh bone; T, the Patella or small bone covering the stifle joint; U, the Tibia or the large, long bone between the hock and the stifle joint; V, the small, long bone behind

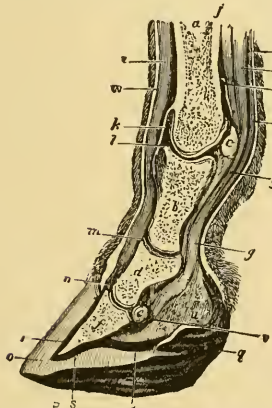
and attached to the Tibia; W, the Hock, which is composed of the following small bones: 1, back point of the hock, Os Calcis; 2, the Astragalus or upper bone of the hock, supporting the Tibia; 3, Cuneiform Magnum, the largest wedge-shaped bone; 4, Cuneiform Medium, or middle-sized wedge-shaped bone; 5, Cuneiform Parvum, or smallest wedge-shaped bone; 6, the small or cubical-formed bone. X, Large Metatarsal or front bone of the hind leg, between the hock and pastern joint; Y, Small Metatarsal or small bone of the hind leg, in rear of Large Metatarsal.

The Head.—1, the lower jaw, (Inferior Maxilla); 2, the upper jaw, (Superior Maxilla); 3, outer part of the jaw, (Anterior Maxilla); 4, bone in front of the nostrils, (Nasal bone); 5, the prominent cheek, (Malar bone); 6, the forehead, (Frontal bone); 7, Parietal bones or sides and upper part of the skull, (wall); 8, Occipital, or bone of the hinder part of the head; 9, Lachrymal bone, inclosing the lachrymal gland and duct; 10, Squamous or scaly portion of the temporal bones; 11, Petrous or hard part of the Temporal bones, inclosing the organs of hearing.

VI. The Foot.

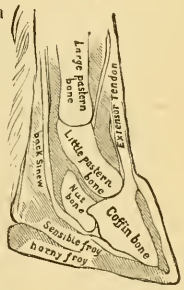
We will now enter upon a more critical examination of the foot, one of the most important parts in the anatomy of the horse. We give a cut showing the bones, as they lie, plainly named, and also a vertical section of the lower leg and foot. The several parts here illustrated are: *a*, cannon or large Metacarpal bone; *b*, large Pastern bone (Os Suffraginis,) *c*, one of the Sessamoid bones; *d*, Os coronæ, small pastern bone; *e*, navicular bone; *f*, Pedis or coffin bone; *g*, *g*, *g*, Flexor Perforans or penetrating tendon; *h*, *h*, Flexor Perforatus or penetrated tendon; *i*, extensor tendon; *j*, suspensory ligament; *k*, *k*, Capsular ligament or membraneous elastic bag surrounding the joint; *l*, fetlock joint; *m*, pastern joint; *n*, coffin joint; *o*, horny crust of hoof; *p*,

Cut 5.



Vertical Section of the Lower Leg and Foot.

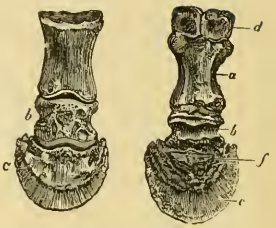
Cut 4.



Sectional view of the bones of the foot.

p, horny sole; *q*, the frog; *r*, sensible laminæ; *t*, the sensible frog; *u*, the cushion; *v*, the navicular joint. The next figures show front and rear views of the bones of the foot. *c*, *c*, Coffin bone; *d*, Sessamoid bone; *b*, *b*, Small pastern *a*, The large pastern.

CUT 6.



FRONT AND BACK VIEW OF THE BONE OF THE FOOT.

VII. The Head and Neck.

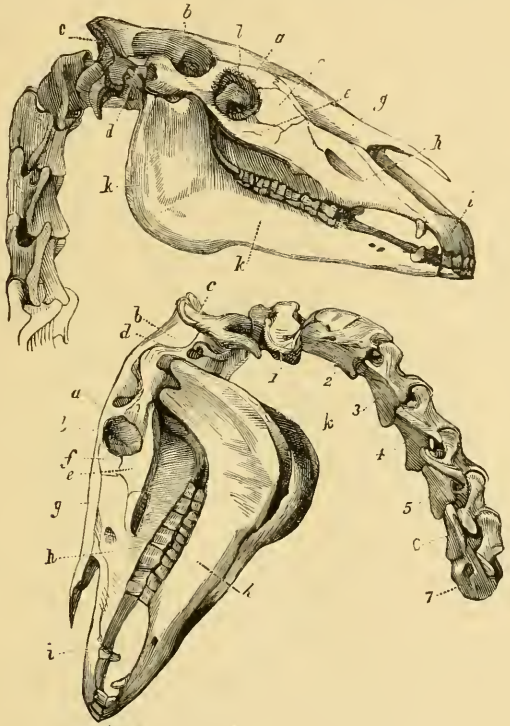
Coming again to the head and neck we are prepared readily to understand their atanomy. The names given to the several parts are as follows: *a*, frontal bone; *b*, parietal; *c*, occipital; *d*, temporal; *e*, malar; *f*, lachrymal; *g*, nasal; *h*, superior maxillary; *i*, pre-maxillary; *k*, inferior maxillaries (lower jaw); *l*, orbit. The bones of the neck, (cervical vertabræ) are named; 1, atlas; 2, dentata; 3, third; 4, fourth; 5, fifth; 6, sixth; 7, seventh. Of the bones of the neck, the atlas is a ring-shaped bone with broad lateral projections. It articulates with the skull, and has great freedom of motion on the next bone (dentata). On the articulation of these two vertebræ, principally depends the power of turning the head. The remaining bones of the neck resemble each other closely, and have various small processes for insertion of the ligaments and muscles, and upon their flexibility depends the power of flexing and arching the neck.

The Head.—The bones of the head may be divided into two gronps; the cranial and facial. The cranial bones include all those which cover or inclose the brain, and are mostly in pairs, or are on what is called the mesial line of the skull, but may, for convenience, be spoken of as single bones.

The bone of the forehead (frontal bone) *a*, forms the space between the eyes and extends to the top of the head with a narrowing outline. It therefore occupies the most central part of the head and is important as from its shape and surface it gives space for the brains. In succeeding cuts the facial expression of horses will be given, showing the different grades of intelligence in horses; the broad and ample forehead indicating intelligence and high breeding.

The parietal bone, *b*, extends back from the frontal to the poll, and has a ridge or crest of great strength and firmness along its upper surface, sloping down like a roof on each side, covering and protecting the brain.

The occipital, *c*, covers the entire back part of the head and lies immediately behind the parietal. It has to support the whole weight of the head, and from its position is exposed to greater strain than any other part of the skull. It is articulated by two rounded protuberances (condyles) at the base to the first vertebra (atlas) of the neck. On the



CUT 7.—SHOWING BONES OF HEAD AND NECK.

outer side of the occipital and beyond the condyles, are two pointed projections (styliform processes) to which some of the muscles of the neck are attached, and which assist in supporting the head.

The temporal bone, *d*, unites with the parietal above, and with the occipital behind. It contains the internal parts of the ear, and is provided with a hollow for the articulation of the lower jaw, and in front joins the extremity of the frontal. Continuing forward, it unites with

the cheek-bone (malar), *e*, making up the zygomatic arch and forming the greatest part of the orbit, composed of a small bone in the inner corner of the eye (lachrymal), *f*. Just before the frontal is the nasal bone, *g*, one of the principal bones of the face and covering the membrane of the nose. The large bone, (superior maxillary), *h*, occupies the side of the face and holds all the grinding teeth (molars) and the tusk of the upper jaw. The pre-maxillary, *i*, unites with the two last named bones, holds the nippers (incisor teeth) and completes the framework of the nose. The lower jaw consists of only two bones, the inferior maxillaries, *k*. They terminate in two processes, directed upward. The terminal projection (condyloid process) articulates with the temporal bone, at the base of the zygomatic arch, forming the hinge upon which the whole lower jaw moves. The second process (coronoid) passes under the arch, receiving the lower end of the large temporal muscle arising from the parietal bone, and moves the jaw in the act of chewing.

There are two small bones in the lower part of the cranium, under the parietal, *b*, called the Sphenoid, and the Ethmoid, which connect the principal bones of the skull, but are not visible externally.

VIII. Bones and Muscles of the Front Limbs.

Coming again to the limbs, we represent in cut 8 on the next page, for the sake of comparison, both the bones and muscles of the front limbs side by side, since it will serve as a convenient object lesson at one view.

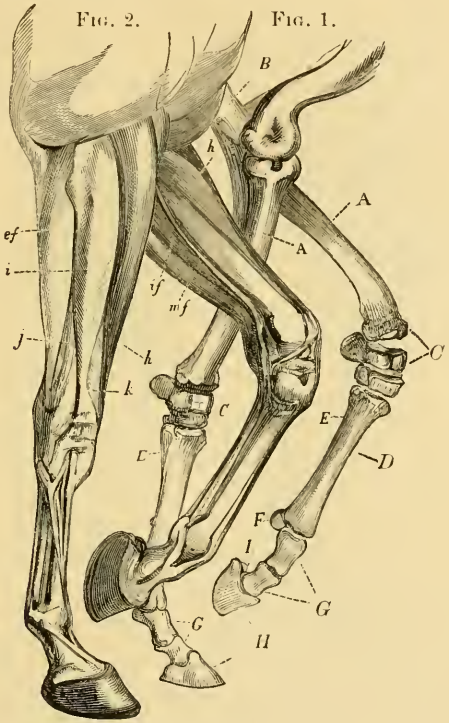
Bones.—A—Radius. B—Point of Ulna. C—Knee (Carpus). F—Sesamoids, behind the fetlocks. G—Upper and Lower Pasterns. H—Coffin Bone. I—Navicular.

Muscles.—*h*—*Extensor carpi radialis*. *i*—*Extensor digitarum longior*. *j*—*Extensor digitarum brevior*. *k*—*Abductor pallicis longus*. *ef*—*External flexor*. *mf*—Middle flexor. *if*—Internal flexor.

Bones of the Arm.—The upper portion of the fore leg in the horse is called the arm, and in man the corresponding bone is the fore arm. In the horse it consists of two bones, the radius A and the ulna B, and extends from the elbow to the knee. The ulna is situated behind, and, to some extent, above the radius, there being a considerable projection received between the heads of the lower bone of the shoulder (elbow), forming a powerful lever, into which are inserted the muscles for extending the arm. The ulna continuing downwards, terminates in a point behind the middle of the radius.

Bones of the Knee.—Cut 9 on page 52 shows in detail the various bones of the knee: Fig. 1, the left leg, outer side; Fig. 2, a front view. The position and action of the knee, render it especially liable to shocks and

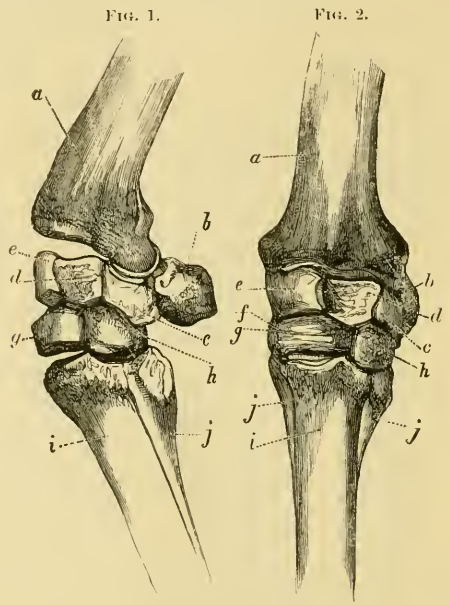
jars, or strains. Hence it is protected by being formed of a number of bones, strongly united by ligaments, each bone being protected by cartilage, and resting on a semi-fluid cushion, so that any shock may be distributed over the whole number of distinct bones. The names of the bones are as follows: *a*, Radius; *b*, Pisiform; *c*, Cuneiform; *d*, Lunare; *e*, Scaphoides; *f*, Magnum; *h*, Unciform; *i*, Cannon; *j*, Splint. These two latter are called Metacarpals.



Cut 8.—Bones and Muscles of the Fore Legs.

By reference to cut 9 on page 52, the arrangement and shape of the several bones will be readily understood. A large, flat knee is essential in the horse, since it not only carries plenty of integument, but allows free play to this portion of the leg. Fig. 1 shows the knee flexed and Fig. 2 the knee at rest.

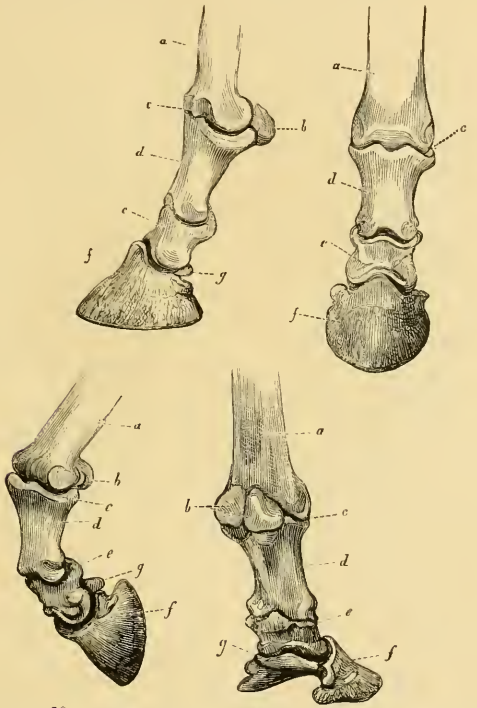
The true carpal bones are seven in number. Six of these are placed in two rows, each containing three bones in front of the joint, while the seventh, the pisiform, (Trapezium), is placed behind them, forming the point of insertion for some of the muscles of the arm. It also aids in protecting the tendons running down behind the leg.



CUT 9.—SHOWING BONES OF THE KNEE.

Bones of the Leg.—Between the knee and the fetlock are three bones, the shank (cannon) and two splint bones, as shown in cut 8, page 51, Fig. 1. D. These form the leg, the corresponding part in man being the metacarpus. The cannon bone articulates at its upper extremity with the lower row of the bones of the knee and below with the upper pastern of the fetlock joint. It has scarcely any muscle, those parts not covered by tendons, as well as the parts so covered being enveloped directly by the skin. The leg bone is nearly straight, rounded in front and flattened or slightly concave behind. The splint bones, slender bones attached to the cannon to strengthen it, diminish to a point before they reach

the fetlock joint. Behind this are two supplementary bones, called sesamoids, *b*, in cut 10, and page 47 *c*. These serve to protect the back of the joint and some important ligaments passing over it. More fully to illustrate the lower part of the front limbs, we give four figures, showing the bones and articulations of the joints of the foot.



CUT 10.—BONES AND ARTICULATIONS OF THE FOOT.

The names of these bones are as follows: *a*, cannon, or shank; *b*, sesamoids; *c*, fetlock joint; *d*, upper pastern; *e*, lower pastern; *f*, coffin bone; *g*, navicular bone. The upper and lower pasterns, *d*, *e*, have considerable motion one on the other to allow the foot to be bent back. The toe is formed by the coffin bone. This is surrounded and covered in by the horny hoof. Hence, its form is never seen unless dissected for. Another small bone, the navicular, *g*, lies behind and partly within the junction of the coffin and lower pastern. Like the coffin bone, it is inclosed by the hoof.

IX. The Hind Limbs.

The bones of the limbs terminating and inclosed within the body of the horse, as well as the whole of the front limbs have been carefully illustrated and described. Many persons suppose, if they understand something of the anatomy of one limb, that they understand them all. This is a mistake, for while there are points in common, there are many differences. Hence the necessity of illustrating every part fully in order that the reader may get a full comprehension of every part. Further on we give a cut showing the bones of the hock joint and portions of the bones above and below. In the illustration, page 44, the anatomy of the entire limb may be studied.

Anatomy of the Hind Limbs.—The great bone of the thigh (femur) which articulates with the upper bone (ilium), which in turn is joined to the back, is very strong, stout and short for its bulk. It is also further strengthened by large projections (trochanters), placed in the direction of the length, or longitudinally, for the attachment of important muscles. The upper extremity of the femur has a rounded head on the inner side, fitting into, and articulating with, a horny cup (acetabulum) formed at the junction of the three pelvic bones. At the lower end are two prominences fitting into depressions in the true bone of the thigh (the lower part of which is shown in the preceding illustration) and in front of which is placed the knee cap (patella), making what is called the stifle joint, which, anatomically, corresponds to the knee in man. The thigh bone is made up of two parts, the tibia, or bone proper and a small bone at the top (fibula), which reaches down the bone for about one-third its length. It is attached to the large bone by cartilage, and corresponds to the small bone (ulna) in the shoulder of the horse. The next illustration shows the bones of the hock. Figure 1, back view, inner side; figure 2, front view, outer side.

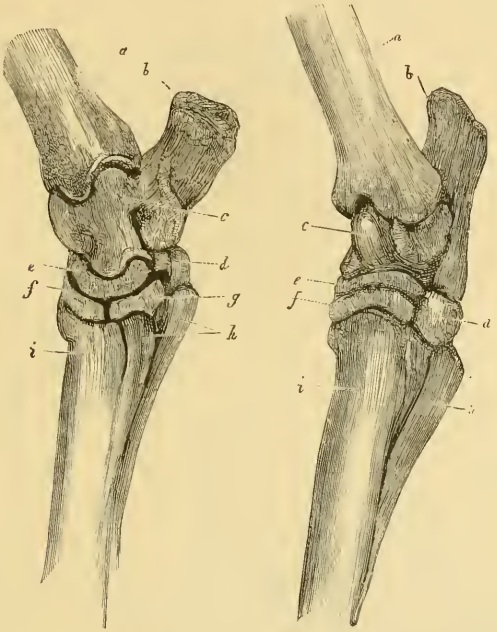
Bones of the Hock.—The names of the bones of the Hock (Tarsus) as shown in cut 11 are: *a*, Tibia; *b*, Os Calcis; *c*, Astragalus; *d*, Cuboides; *e*, Naviculare; *f*, Outer Cuneiform; *h*, Splint; *i*, Cannon, (shank bone.)

The hock is as important as it is complicated. It corresponds to the ankle and heel in man, and is a prime factor in the means of progression. Like the knee of the horse, it consists of small bones, interposed between the upper bone, Tibia, and the Cannon bone below. These are six in number, as given above. The projecting bone at the back, the heel bone, (Os Calcis), is moved by tendons arising from muscles in the lower part of the limb.

One of the Main Springs.—The principal one of these is the tendo-Achillis. In all fast animals it is much developed, since an increase in

the length of this lever adds force to the spring; for it must be remembered that progression is simply a succession of springs. Hence, in all four-footed animals, the chief motive power lies in the hinder limbs,

FIG. 1. FIG. 2.



CUT 11.—BONES OF THE HOCK.

and hence, again, the reason why these are so much developed. Whether the animal be required for draft or saddle, the propelling power requires to be especially studied. The skeleton is the frame-work upon which all this is developed.

CHAPTER III.

THE MUSCULAR SYSTEM AND INTERNAL FUNCTIONS OF THE HORSE.

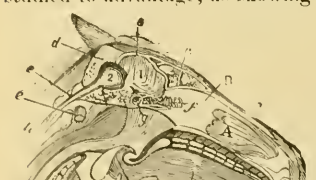
I. THE ECONOMY OF THE MUSCULAR COVERING.——II. MUSCLES OF THE HEAD AND NECK.——III. MUSCLES OF THE SHOULDER AND BACK.——IV. MUSCLES OF THE HINDER PARTS.——V. MUSCLES OF THE FORE LIMBS.——VI. MUSCLES OF THE LEG AND FOOT.——VII. STUDYING THE STRUCTURE.——VIII. INTERNAL ECONOMY OF THE HORSE.——IX. EXTERNAL PARTS OF THE HORSE.

I. The Economy of the Muscular Covering.

While, as already stated, the bones are the frame-work of the animal, the covering of the bones, viz: the sinews, muscles, nerves, membranes, etc., are really what constitute the motive power of the animal. With the nerves and membranes we shall have little to do; their study will not be necessary to a correct understanding of the value of a horse to the farmer, breeder, or buyer. The bony and muscular development being perfect, and the digestive apparatus, the viscera, and all that pertains thereto, being healthy, the nerves and membranes may be taken for granted as being in good order. We therefore proceed at once to a consideration of the more important organs which constitute the working parts of the horse.

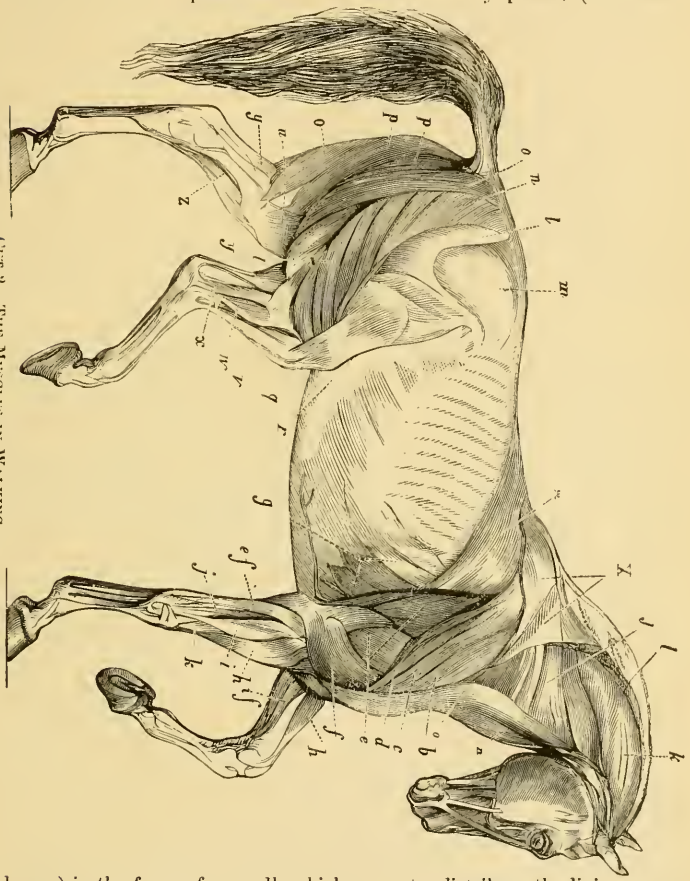
This we have most carefully illustrated on the next page by a cut, showing the entire figure of the horse with the principal muscles laid bare. They need not be referred to here, since they will be named further on in considering the illustrations of the several parts. The engraving is considered necessary, as showing the connection of the parts, one with another, as the animal appears in walking.

A Vertical Section of the Head.—A section of the head may here be studied to advantage, as showing not only the bony and muscular structure, but the brain and ganglia as well. In the study of this figure we find at *a*, the frontal bone, showing the cavity or channel, (*sinus*) beneath; *b*, the wall bone (*parietal*) covering the brain: *c*, the nose (*nasal*) bone: *d*, the bone (*occipital*) at the back of the head; *e*, *e*, the first bone of the neck, (*atlas*) showing the spinal marrow in the center; *f*, the sieve-like (*ethmoid*) bone through which the nerve, (*olfactory*) giving the sense of smell passes; *g*, the wedge-like bone, (*sphenoid*). This, with the ethmoid bone, supports the base of the brain. At *h*, between *C* and *D* is shown part of the lower, (*max-*



CUT 1. HORSE'S HEAD. OPEN TO VIEW.

illary) jaw bone, with the lower nipper (*incisor*) teeth. Coming to the numerals: 1, is the large portion of the brain, (*cerebrum*); 2, the small brain (*cerebellum*); 3, the upper portion of the spinal marrow (*medulla oblongata*), where it leaves the small brain; 4, the spinal marrow itself. The capitals show, at *A*, the thin bony plates, (turbinated



bones) in the form of a scroll, which serve to distribute the lining membrane of the nose; *B*, the cartilaginous division, (*septum nasi*) between the nostrils; C, C, the lips; D, the tongue; E, the valve of the larynx (*epiglottis*;) F, the wind pipe, (*trachea*); G, the gullet (*œsophagus*).

Economy of the Head.—We have heretofore spoken of the bones of the head being in pairs. So also are the various organs of the body as a rule, namely: the ears, eyes, nostrils, lips, the lobes of the lungs, the valves of the heart, the kidneys, etc. Thus the two frontal bones (*a*) make up the forward part of the head. The wall bones (*b*) cover the outer lobes of the large portion of the brain. The occipital bone (*d*) is strong and solid, and at its back contains the spinal marrow, and some nerves and arteries which pass from the brain; at the point where it is jointed to the first bone of the neck it is rounded and smoothed to make the articulation perfect. The sphenoid bone (*g*) forms the inferior and central part of the skull (*cranium*). Near the bones of the face (*facial bones*), are sinuses or channels, that are named from the bones which they pierce or channel. The bones of the head are of two kinds, the soft and scaly, (*squamous*), and the hard, (*petrous*), bones. The temporal bones are likewise of both kinds; the hard portion contains the organ of hearing, and on its inside surface are openings for the passage of the auditory nerve, and on its outside larger openings for the passage of sound.

II. Muscles of the Head and Neck.

The muscles of the head are not many. Those of the mouth, nostrils, ears and neck, are the most important from the standpoint of the breeder. Cut 3 on the next page we give shows, at two views, the various muscles of the head and neck.

The Muscles of the Head.—*a*, the cheek, (*Masseter*) muscle: *b*, temporal muscle, (*temporalis*); *c*, circular muscle, (*orbicularis*), surrounding the eye; *d*, the raising muscle, (*levator*); *e*, *orbicularis ovis*; *f*, the *dilator naris lateralis; g, Zygomaticus; h, nasalis labii superioris; i, depressor labii inferioris.*

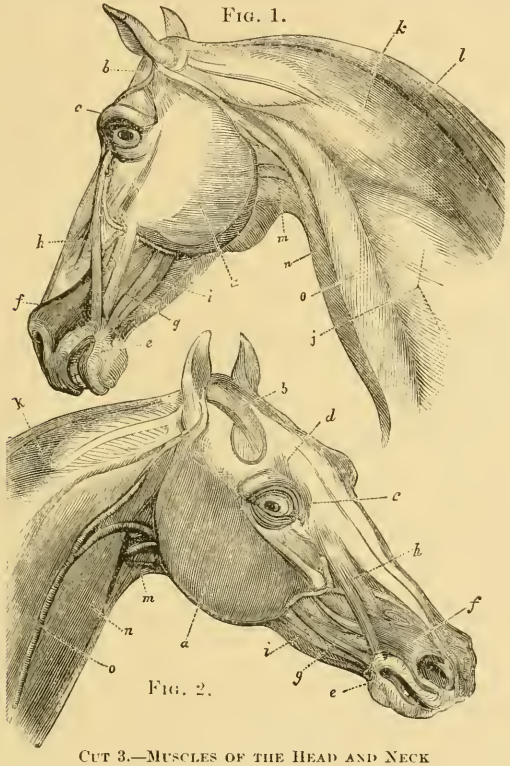
Muscles of the Neck.—*j*, *complexus major; k, splenius; l, levator anguli scapulae; m, Hyoideus; n, sterno-maxillaris; o, levator humeri* or *deltoides.* The masseter (*a*), forms the cheek of the horse, extending along a ridge by the side of the head, below the eye to the rounded angle at the rear of the lower jaw; its function is to close the jaw. The temporal muscle, (*b*), also assists in the action, and the dimpling seen above the eye in the process of chewing, arises from the action of this muscle while opening and closing the jaw.

The action of the muscle *orbicularis* is to close the eye-lids. Above the eye, passing inward and upward, over this muscle is the *levator* muscle (*d*). Its office is to raise the upper lid.

The muscles of the ear are not conspicuous. One of them proceeds from the base of the ear, extends forward and turns the ear forward. The second, situated behind the ear, turns it inward and backward, while the third muscle, a narrow strip, descends at the back of the cheek, and turns the ear outward.

The muscular covering of the frontal and nasal bones is not prominent and does not require mention here.

Muscles of the Nose and Lips.—The muscles of the nose and lips are important, since on them depend the act of gathering food, and also the expansion and contraction of the nostrils in breathing. They are also



Cut 3.—Muscles of the Head and Neck

an index, together with those of the ears, in discovering much of the temper of the horse. *Orbicularis oris* (*e*) is one of the most important of these. It entirely surrounds the mouth, and by its action closes or opens the lips. A pyramidal muscle (*dilator naris lateralis*) (*f*) covers the whole of the nostril, and also raises the upper lip.

The muscle shown at *h* (*nasalis labii superioris*) extends from a depression in front of the eye towards the angle of the mouth and divides

into two parts to permit the passage of the side dilator of the nostril (*f*), one branch passing straight to the corners of the mouth; its use being to raise it. The other branch expanding under the side dilator, not only assists in dilating the nostril, but also in lifting the upper lip.

The under lip is drawn back by the narrow muscle (*i*), which is inserted into the lip below the angle of the mouth. Passing along the side of the jaw, it disappears under the *masseter* or cheek muscle (*a*).

Muscles of the Neck.—One of the principal muscles of the neck rises from the transverse processes of the first four or five dorsal vertebræ, page 42 (3), and also from the five lower bones of the neck (2), same page. The fibers from these two points, uniting form one large muscle, which, in fact, makes up the principal lower part of the neck, and which, diminishing in size as it passes towards the head, terminates in a tendon inserted in the (*occipital*) bone covering the back of the head. See page 49 (*e*). Immediately above is the muscle *splenius* (*k*,) page 59. It is used for raising the head. This muscle arises from the entire length of a strong and elastic ligament (*ligamentum nuchæ*), having its origin from the back of the occipital bone, to which it is attached immediately below the crest. At first cord-like, it passes over the first joint of the neck and adheres strongly to the second bone of the neck, on which the principal weight of the head is thrown; it thence proceeds backward unto its termination on the elevated spinous processes of the bones of the withers. Thus the withers have to support the entire weight of the head and neck, when held in their usual position.

To return to the *splenius*. It is inserted directly into all the bones of the neck except the first, but having with this and the temporal bone, a separate and distinct connection. To its form and development, the muscularity and beauty of the neck are chiefly due. The thick crest and massive neck of the stallion, is principally due to its great development. If overloaded with cellular tissue or fat, the neck will be clumsy. These facts cannot be too carefully borne in mind, for whatever the condition or breed of the horse it is this muscle which gives character to the neck.

Behind the *splenius*, and extending along the upper margin of the neck, is a muscle (*levator anguli scapulae*) (*l*). Inserted in the back of the head, and attached to the first four bones of the neck and to the great ligament, it descends to the shoulder, out of sight. Its action is reciprocal on the neck and shoulder, according as one or the other may be fixed at the time.

Muscles of the Front of the Neck.—On page 59 (fig. 2, m.) immediately below the head at its junction with the neck, its upper extremity, conspicuous, is the muscle *hyoideus*. It is attached to the hyoid bone of

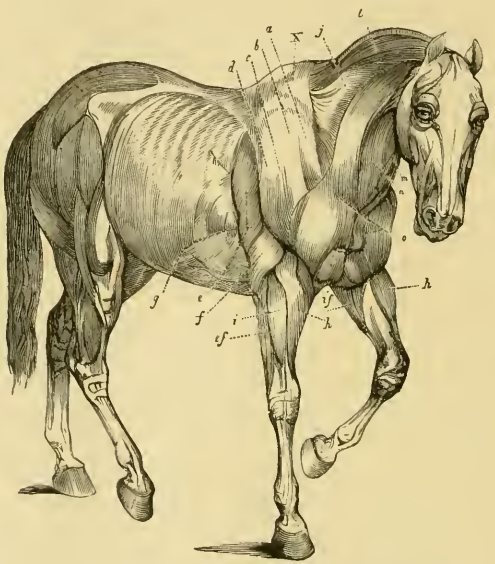
the tongue, which it retracts; descending along the front of the neck to the shoulder, it is for the greater part of its length, covered by other muscles. The principal depressor muscle of the head, called *sterno-maxillaris*, (*n*,) partly covers the last named. It rises from the upper part of the point of the breast, (*sternum*), covers the lower front of the neck, proceeds upward by the side of the retracting muscle of the tongue, and is inserted by a flat tendon into the rear angle of the lower jaw. It is not a large muscle, since it requires but little force to depress the head.

Extending from the back of the head and upper part of the neck, along the front of the shoulder, to the top of the fore leg, and beyond the *sterno-maxillaris*, is a long and important muscle (*levator humeri*, or *deltoides*) page 57 (*o*) having a double function to perform. The head being held up by its own proper muscles, it then becomes the fixed point from which the *levator humeri* raises the shoulder. But its action can be reversed. With the shoulder as a fixed point, the head can be depressed by means of a small slip of the muscle being carried forward to the point of the breast bone to bear the head in that direction. In conclusion, it may be stated that the muscles are *all arranged in pairs*, sometimes, but rarely, in contact; so that in speaking of them in the singular, their position and function is to be understood as applying to each side of the animal.

III. Muscles of the Shoulder and Back.

In every science the use of Latin has generally been adopted in naming the several parts and objects. The reason of this is that the true and exact meaning of the names is thus preserved with scientific accuracy, which could not always be the case if these terms were loosely translated from and into the various languages of the earth. In English and in other languages there are several names for one and the same object. Once named in scientific nomenclature the object remains fixed and clearly defined by its scientific name as long as the science lasts. Sometimes it would take many words to express the same meaning, and when necessary the meaning of the scientific term is explained. Sometimes there is no common name, and hence we are obliged to depend upon the Latin name. For instance the *trapezius* is the muscle whose office it is to raise and support the shoulders, assisted by another important muscle, (*serratus major*) (*g*,) a muscle that is hardly visible externally, since it is situated between the ribs and shoulder blades, and forms the main connection between them. Hence in explaining the illustrations we use these terms, explaining them, so far as may be necessary, in the body of the text.

The muscle, *trapezius*, previously noticed rises from the ligaments of the neck, and the principal bones of the withers, terminating in a pointed shape on a prominent part of the shoulder blade, and is at x.



CUT 4.—SHOWING MUSCLES OF SHOULDER AND ADJACENT PARTS.

The muscle occupying the outer surface of the shoulder blade (*scapula*,) on the front side of the spine or ridge of that bone is termed *antea spinatus*, and is shown at *b*, on pages 57, 62 and 64. It proceeds to the lower bone of the shoulder, and dividing into two parts, is inserted into the two prominences in front of it. Its use is to extend the bone forward.

Situated on the other side of the shoulder blade and inserted into the upper and outer head of the bone, drawing it outward and raising it, is the muscle called *postea spinatus*. Behind it is a small muscle (*teres minor*) (*d*,) or little pectoral. Its office is to draw the shoulder forward towards the breast.

Inside the arm, at its junction with the body, is an important and conspicuous muscle, the large pectoral muscle (*pectoralis major*) shown

at pm, page 64. This muscle pulls the whole fore leg inwards keeping it in a line with the body, so as to induce an even and regular action of the limb.

On the outside of the shoulder, and easily seen when a horse is in motion, are two muscles, (*e*) (*anconæus longus*) and (*f*) *anconæus externus*) whose office is to straighten and extend the arm. That is, to bring the front limb down perpendicularly, and in a line with the lower bone of the shoulder (*humerus*). Arising from the lower bone of the shoulder, they are inserted into the point of the elbows. The muscles which bend the arm upwards are not visible in the living animal, being almost entirely covered by those of the shoulder.

The principal muscle of the back is the *latissimus dorsi*, shown on page 62 as extending from the shoulder to the haunch, and on pages 57 and 64 at the *; it is strongly attached to the processes of the back bones and ribs, and is employed in raising the fore and hind quarters, and in rearing and kicking. The portion which comes nearest the surface is that part which is covered by the saddle. No portion of it, however, is distinctly apparent without dissection.

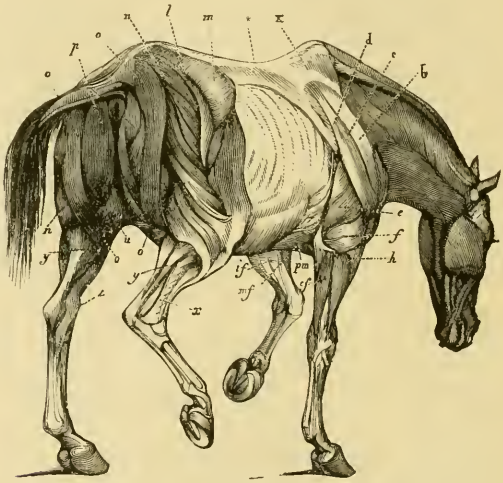
IV. Muscles of the Hinder Parts.

The muscles shown in cut 4, are: *x*, *Trapezius*; *a*, *Pectoralis minor*; *b*, *Antea spinatus*; *c*, *Postea spinatus*; *d*, *Teres minor*; *e*, *Anconæus longus*; *f*, *Anconæus externus*; *g*, *Serratus major*;*, *Latissimus dorsi*; *pm*, *Pectoralis major*. These two latter are figured in the illustration on page 64.

The Muscles of the Hind Quarters.—The illustration on page 65 shows all the prominent muscles of the hind quarters laid bare. Their names and references are as follows: *l*, *Glutæus externus*; *m*, *Glutæus medius*; *n*, *Triceps femoris*: *o*, *Biceps*; *p*, *semi Membranosus*, (shown on page 57); *q*, *Musculus faciæ latæ*; *r*, *Rectus*; *s*, *Vastus externus*; *u*, *Gracilis*; *v*, *Extensor pedis*; *w*, *Peronæus*; *x*, *Flexor pedis*: *y*, *Gastrocnemii*; *z*, *Flexor metatarsi*.

The Muscles Described.—The muscles of the hind parts are mostly strongly marked, and the situation of the principal ones will be easily recognized. With them will be included those concerned in or connected with the motion of the hinder limbs. Among the most prominent of the muscles on the front and outer parts of the haunch is that one (the *Glutæus medius*) arising from the processes of several of the vertebræ of the loins and from the prominent parts of the *ilium*, (the side bone of the pelvis heretofore described) and terminating at its insertion in the great trochanter or projection on the upper bone of the thigh (*femur*).

It is an important and powerful muscle and is used in raising and bringing forward the upper bone of the thigh. It has been not inaptly called the kicking muscle, and is shown at m, on pages 57 and 64 and 65. The *glutæus externus*, *l*, is a slender muscle attached to the kicking muscle and has a similar origin and function. It may be called the assistant kicking muscle.



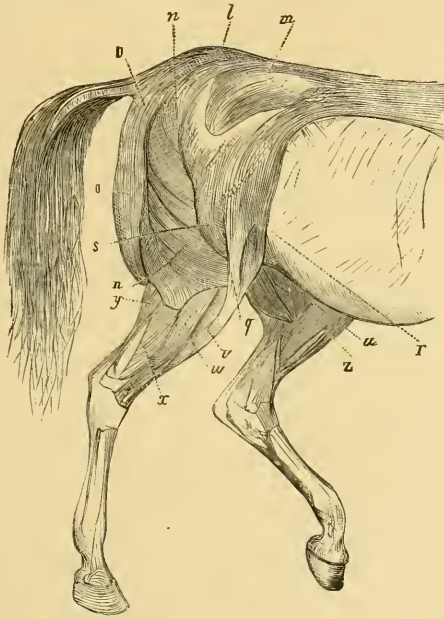
CUT 5.—REAR SIDE VIEW OF THE MUSCULAR COVERING.

The Three Headed Muscle.—When the horse is in motion a conspicuous muscle of the hind-quarter is the three headed muscle of the thigh (*triceps femoris*), shown at *n*. This is really three muscles in one, each having a common origin and united together. It comes from several of the bones of the spine, including some at the root of the tail, and from various parts of the haunch bone. It curves downwards and forwards, dividing into three heads. These are inserted broadly into the upper part of the lower bone of the thigh behind the knee (*stifle joint*). Its action straightens the leg, and it has great power in carrying the animal forward, for while the *glutei* muscles bend the leg before it takes the spring, the *triceps*, acting in opposition, forces the leg straight and lifts the body forward. The hinder margin of this muscle may be seen in all horses, parallel to the outline of the buttock, but it is prominent in racing

and trotting horses, when proper exercise has brought them into condition.

Parallel with the *triceps* and immediately behind it is the *biceps*, shown on pages 57, 64 and 65, at *o*. Springing from the sacrum and the first bones of the tail, it descends to the inner side of the lower bone of the thigh, forms the outer rear border of the haunch and assists in straightening the leg.

Another flexor of the leg, forming the inner rear border of the haunch, and uniting on the mesial line with its fellow muscle of the other quarter is the *semi membranosus*, shown on page 64, at *p*, and also on page 57, at *p p*.



CUT 6.—SHOWING MUSCLES OF THE HIND QUARTERS.

At the outer front part of the haunch, is a peculiar muscle which binds down and secures the other muscles in front of the haunch. It is the *musculus fasciæ latæ*, shown at *q*, pages 57 and 65. It arises from the forward portion of the crest of the *ilium* and is enclosed between two layers of tendinous substance which disappear below the stifle.

The *Rectus*, *r*, forms the front edge of the thigh, and proceeds from the *ilium*, in front of the hip joints, and is inserted into the knee cap, (*patella*) at the stifle joint. This muscle forms the front edge of the thigh.

The *vastus externus*, *s*, is a large muscle behind the *rectus* and is also inserted into the patella. Only a part of it can be seen externally, and both this and the rectus are powerful extensors of the thigh.

The *sartorius*, or tailor's muscle, is a narrow strip descending inside the thigh, and terminating just below the stifle joint. It bends the leg, (*tibia*), and turns it inward. It is hardly visible. The *gracilis*, *u*, lies by the side of this muscle, and at the rear of it, occupying the principal surface of the inside of the thigh, (*femur*). It is inserted into the upper part of the lower bone of the thigh, (*tibia*).

V. Muscles of the Fore Limbs.

These have been delineated on page 51, in connection with the corresponding bones; their names are there given. The elbow is the lever into which the muscles for extending the arm are inserted. They are of great power, and they extend up to the muscles of the shoulder, with which they are connected in reciprocal action.

VI. Muscles of the Leg and Foot.

The most important of the muscles which move the lower portion of the leg and foot, is the *extensor pedis*, seen on pages 57 and 65, at *v*. It comes from behind the stifle, from the extremity of the two bones of the thigh, (*femur* and *tibia*). Descending to the hock, its tendons pass under a sheath, confining it to its place in front of the joint. Thence it continues to the foot, and, widely expanding, is inserted in front of the coffin bone.

The *peronœus*, seen at page 57 and 65 at *w*, comes from the *fibula*, and taking much the same course as the last-named muscle, but in a more lateral direction, the tendon passes on the outside of the hock and descends to the foot with the *extensor pedis*. These two muscles act to lift the foot forward. Between them is another narrow muscle, which acts with them, and the tendon of which is seen just above the hock.

One of the principal muscles for bending the foot is the *flexor pedis*, shown at pages 57 and 64 and 65 at *x*. Rising from the upper part of the tibia, it becomes tendinous before reaching the hock, and as a round, large cord passes through a groove at the back of that joint. Then descending behind the shank bone, it is inserted in the two pasterns.

At the back of the thigh (*tibia*) may be seen the extremities of the *gastrocnemii*, pages 57 and 64 and 65 at *y*. The united tendons (*tendon*

Achilles) pass to the point of the hock where they are inserted. In the horse the *gastrocnemii* are important muscles, and are aided by the plantaris.

The *flexor metatarsis* is the muscle which bends the leg. It is on the inside of the thigh (*tibia*), and is shown on pages 57 and 64 and 65 at *z*. Originating above the stifle on the upper bone of the thigh (*femur*), it is inserted into the shank and inner splint bone.

VII. Studying the Structure.

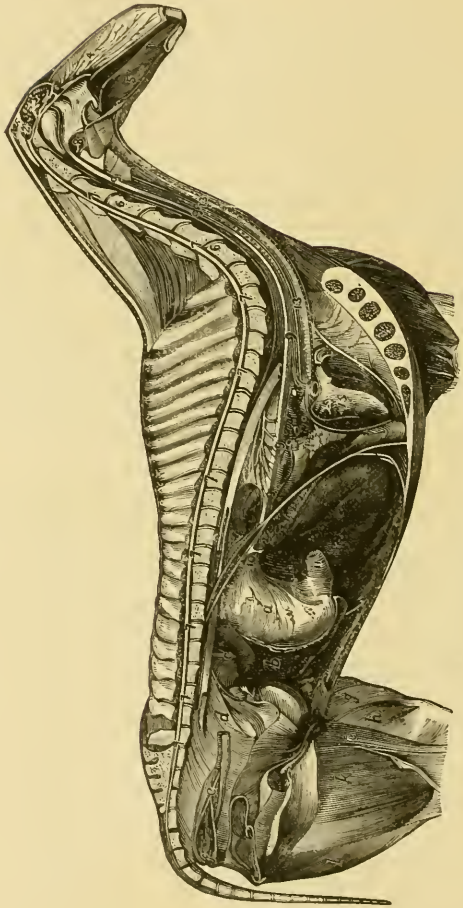
Thus we have carefully gone over the bony and muscular structure of the horse, giving only such information as is indispensable for every horseman to have. The artist, from careful study of the anatomy and physiology of an animal, is able to draw and paint it correctly. The horseman should study it from the same standpoint. Thus both will be enabled to carry in the mind the appearance of a well-developed horse. The surgeon studies anatomy from a somewhat different standpoint. He wants to understand the various articulations, muscles, arteries, tendons, nerves, ganglia and viscera, with a view to surgery and the cure of diseases. The horseman and breeder studies anatomy and physiology to arrive at a better understanding of what goes to make up a good animal, endowed with speed, style, or development for draft.

VIII. Internal Economy of the Horse.

We next discuss the internal economy of the horse. For a better understanding of the subject, we give a longitudinal section of the horse, showing *Thorax* (cavity of the chest, windpipe, etc.), *Abdomen*, *Pelvis*, etc., the intestines and liver being removed; see next page.

Names of the Parts.—The explanation of the illustration is as follows:

1. That part of the skull (*occiput*) forming the hind part of the head. 2. The smaller division of the brain, or *cerebellum*. 3. The front or principal part of the brain, called the *cerebrum*. 4. The cartilege between the nostrils, *nasal membrane*. 5. The tongue. 6,6. Joints, *articulations*, of the neck bone. 7,7,7,7. The spinal cord or marrow. 8. *Pharynx*; the cavity into which the mouth and nose open, and which is continuous below the *œsophagus*. It is bounded by the membraneous and muscular walls beneath the base of the skull. 9,9,9. The passage, *œsophagus*, through which the food and drink go to the stomach. 10. The entrance of the stomach, passing through the *diaphragm*. The *diaphragm* is the membrane separating the thorax from the abdomen, shown by the curved line. 11. The orifice of the stomach, *pylorus*, through which the food passes into the intestines. 12,12. The inner surface of the membrane, (*diaphragm*), which separates the stomach and bowels from the heart and lungs. This membrane also assists in the act of

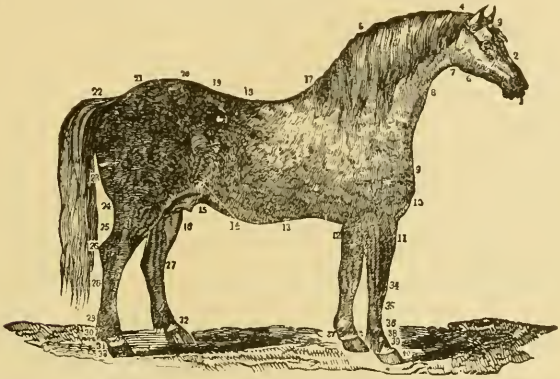


CUT 7.—LONGITUDINAL SECTION OF HORSE, SHOWING INTERNAL ECONOMY.

respiration. 13,13. The wind-pipe, *trachea*. 14. The lungs. 15. The heart. *a*. The stomach. *b*. The spleen, sometimes called milt. *c*. The left kidney. *d*. The broad ligament of the uterus or womb, with the ovary or organ of generation displayed. *e*. The last portion of the large intestine, the *rectum*. *f*. The orifice of the large intestine, the *anus*. *g*, *h*, *i*, *j*, *k*, and *l*. These letters show the internal muscles of the thigh. They have already been explained.

IX. External Parts of the Horse.

This cut shows the external parts of the horse with their proper names.



CUT 8.—SHOWING EXTERNAL PARTS OF THE HORSE.

Explanation:—1—The muzzle. 2—The face. 3—The forehead. 4—The poll. 5—The crest. 6—The jowl. 7—The gullet. 8—The wind-pipe. 9—Point of the shoulder. 10—The breast. 11—The arm. 12—The elbow. 13—The girth. 14.—The flank. 15—The sheath. 16—The stifle. 17—The withers. 18—The back. 19—The loins. 20—The hip. 21—The croup. 22—The dock. 23—The quarter. 24—The thigh or gaskin. 25—The ham-string 26—The point of the hock. 27—The hock. 28—The cannon bone of hind leg. 29—The fetlock. 30—The large pastern. 31—The small pastern. 32—The coronet. 33—The hoof. 34—The knee. 35—The cannon of fore leg. 36—The fetlock. 37—The heel. 38—The large pastern. 39—The small pastern. 40—The hoof.

CHAPTER IV.

OUTWARD APPEARANCE OF THE HORSE AS INDICATING VALUE.

I. ACTION THE FIRST REQUISITE OF A GOOD HORSE.——II. FAST WALKING HORSES.——III. HORSES FOR DIFFERENT KINDS OF WORK.——IV. THE HEAD ILLUSTRATED OUTWARDLY.——V. THE BODY AND LIMBS.——VI. BAD FOREQUARTERS.——VII. THE BODY AS SEEN FROM THE FRONT.——VIII. WHAT A CRITICAL HORSEMAN SAID.——IX. FRONT VIEW, SHOWING BAD FOREQUARTERS.——X. THE HINDER PARTS ILLUSTRATED.——XI. THE PROPELLING POWER.——XII. WHAT THE ANCIENTS KNEW OF HORSES.——XIII. WHAT ONE NEED NOT EXPECT.

I. Action the First Requisite of a Good Horse.

A horse, like every other farm animal, is to be bought with a view to the use for which he is intended. The buyer must therefore know what he wants the animal for; if for slow draft a very different frame will be required from that needed when fast work is to be done; and yet the general symmetry of the animal must be looked to in every case. Further on the various breeds will be illustrated. The present chapter will deal simply with the outward conformations, showing good and bad forms, just as the preceding chapters have illustrated the bony structure and the muscular development. Action is of course the first requisite whatever use the horse is intended for, and fast walking is the groundwork upon which to build all other action. We give on the next page an illustration of a horse, as seen in a fast walking gait.

Action in General.—Good action can never be gotten out of a lazy, lubberly horse. The animal must have spirit and ambition, whatever the breed. Action is of only two forms: smooth, safe, low action, and high, showy, or parade action. The latter is never admissible, except when the horse is intended only for show and parade, or for a certain class of carriage horses, or for slow driving or riding in parks or other places of public resort. It is unsafe, unless the animal be intelligent and naturally sure-footed; for a high stepping dolt is generally bad-tempered, and as unsafe as he is ungainly. When slow-and-safe and fast-and-safe action are combined in the same animal, he is invaluable and should not be lightly parted with.

Good action is attained when all the limbs are moved evenly and in accord one with the other, the hind limbs being kept well under the animal, ready for any emergency. The action should be square in walking or trotting and without paddling with the fore legs, or straddling behind. It is true that paddlers are staunch and sure footed, and horses that straddle behind are sometimes fast, but this is in spite of such action, and not on account of it. They are never admissible, either in fine harness or under the saddle.

II. Fast Walking Horses.

It is seldom one sees a horse that will walk four and a half or five miles an hour in regular 1-2-3-4 time, nodding his head in cadence. Yet any horse that conforms to the configuration shown in the cuts hereafter

MOVEMENT IN WALKING.

given in this chapter may easily be taught to do it, either under the saddle or in harness. Some horses may be taught to walk six miles an hour, but they are rare. As a rule, fast-walking horses may be taught to trot fast, though some fast-walking horses are too broad-chested, to trot fast,

and they will roll in galloping. It is for this reason that we give the illustrations, showing the perfect conformation for perfect action. A horse that is good at all gaits, is a horse perfect in his conformation. Hence, a perfectly-formed horse will well repay careful training, for such a one will bring a large price for the time and labor spent upon his education; or if it be a mare that is to be kept for show, and later for breeding, the labor of training will not have been thrown away.

III. Horses for Different Kinds of Work.

Speed and bottom, which indicate the superior bone and muscle of good breeding, combined with great lung and heart power, whatever the breed, are what is desired in a horse. The nearer the animal comes to the Illustrations given, the better will he be for general utility, and measurably so whatever the labor desired. The horse for heavy draft will be coarser, more stocky, heavier in the bone, not so flexible in the limbs, more upright in the shoulder, longer-haired, and perhaps with less courage. Occasionally, however, a thoroughbred makes a first-class work horse, if trained to get down steadily to the work. This very flexibility enables him to take a hard and long-continued pull without injury, and it brings the oblique shoulder of the blooded horse straight in the collar. Yet thoroughbred horses are not draft horses, and were never intended to be, though they have imbued nearly every valuable breed existing to-day with some of their best characteristics.

IV. The Head Illustrated Outwardly.

The head is the seat of intelligence in all animals, and without intelligence we cannot have a good servant. The illustrations on pages 74 and 75 show the formation of heads from good to bad. Those on page 74 show the perfectly-formed head of a well-bred horse, presenting a side and front view, that may be taken as a type constituting perfection, as near as may be. The side view exhibits the head fine and tapering to the muzzle, and the chin handsomely developed. The brow is smooth, distinct, and yet not heavily prominent. The eye is large, full, clear, and has a placid, intelligent expression. The ears are fine and flexible, rather large, but well pointed, and alive with intelligent motion. The jaw is strong but fine. Observe the muscularity of the neck, and at the same time, its lines of swelling and delicate grace. Observe especially the manner in which the head is set upon the neck. Again, it will be seen that the face is dished slightly, showing spirit, tempered to intelligent tractability.

Now take the front view of the same head. Observe the great smooth swelling forehead, looking really broader between the eyes than it is. Why? It will be seen that the eyes are apparently at the side of the

head, and yet look straight forward. The temporal bones at the side of the eyes, and the occipital bone at the top of the head between the ears, are prominent. The nostrils and lips are large and flexible, and if one could turn back the folds of the nostrils at the ends, we might see a moist and healthy inside surface. In the living head corresponding to the figure, all this would be apparent.

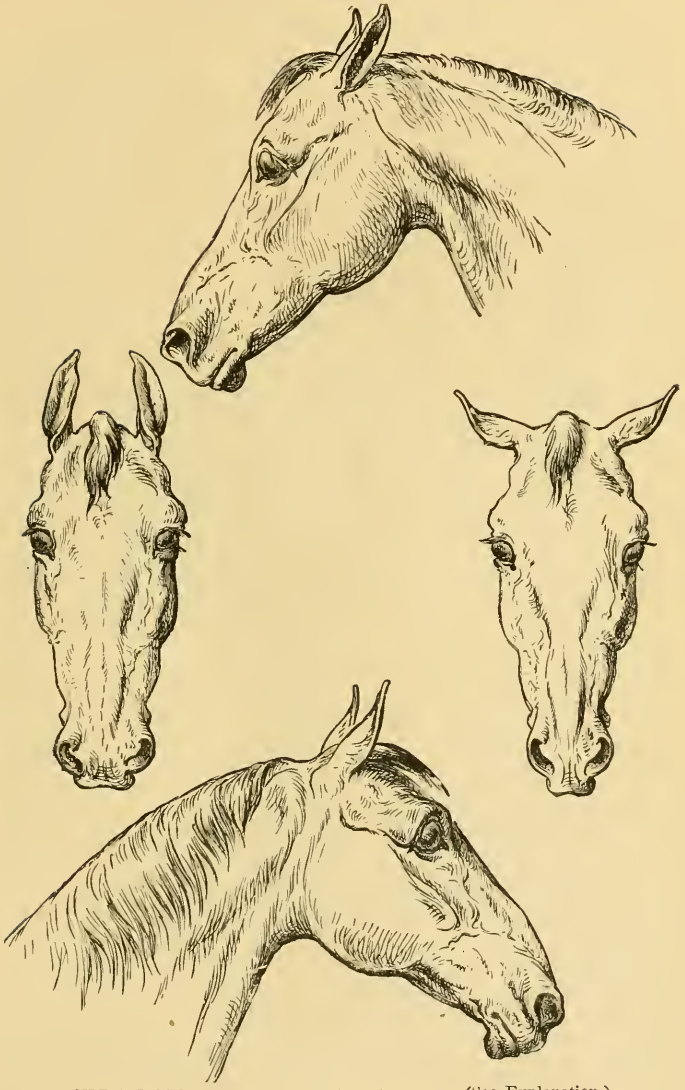
If we examine the side and front views of the heads shown on the opposite page, the side view at the top indicates a head somewhat heavy, with the nose and lower jaw too thick. The nose swells out above the nostrils. The face is not dished, but is depressed. The eyes are bright, but with a somewhat wild expression. The eyebrows are prominent, and the head broad. The ears are thrown back, and the muzzle is cruel in its expression. The head is set on the neck at too great an angle. The expression, as a whole, is indeed that of an intelligent and spirited horse, but it is the intelligence of malice, and the spirit of self-will.

In the front view, it will be seen that the eyes are too close together, and are in the front of the head rather than at the sides. The ears are pointed close together and backward, as though the animal only wanted the chance to do mischief. The face is full of strong lines, but not smooth ones. They are those of a stubborn animal that may do as you wish, if he cannot or dare not do otherwise.

The next figure to the right shows not only a cruel, but a stupid expression. There is a lack of intelligence, which, in the horse, means spirit, courageous docility, and a generous desire to do the will of a kind master. While this head does not show particularly bad form, yet the general expression, drooping ears, and the dull eye, show less character than the average horse should possess.

There is yet another form, and a worse one. It is shown at the bottom of the page. Here we have self-willed obstinacy, and a wild, sulky disposition. The profile is curved, giving a Roman nose, and the eyebrows are raised, indicating self-will and wildness. The firm jaw and lower face are cruel. It is a face that never goes with a horse safe to drive single, or to ride, except in the hands of one who is perfectly master of himself, and at the same time, always watchful and firm. Thus we might go on describing all the peculiarities of temper down through nervous timidity, as shown by the thin, clean face, the cowardly head, the idiotic, and even the head showing evidences of insanity; for that there are horses subject to hallucinations, aberrations of mind, and even actual insanity, there is no doubt. The cowardly, the vicious, and the idiotic horse is never safe. The aberrant and the insane horse is always dangerous, even to the most practiced horseman, since neither caresses nor punishment avail. They will run their "muck" at any hazard.

SIDE AND FRONT VIEW OF HEADS—GOOD. (See Explanation.)



SIDE AND FRONT VIEW OF HEADS—BAD. (See Explanation.)

V. Body and Limbs.

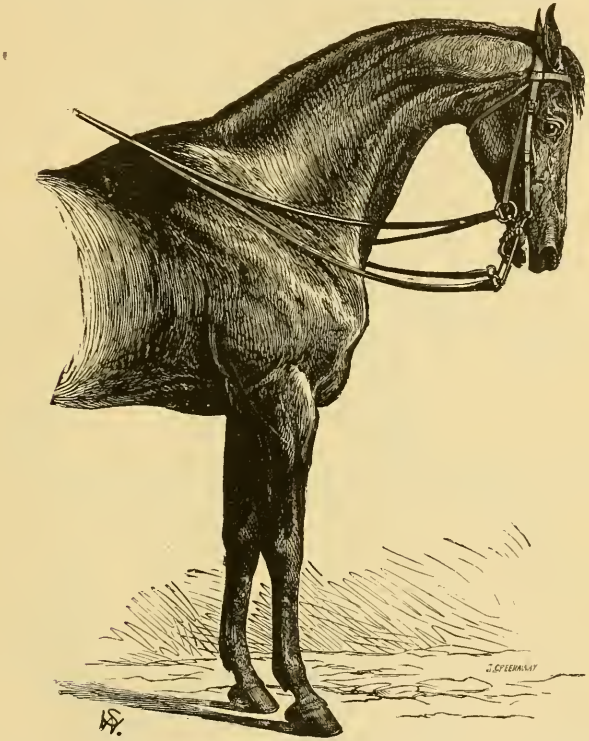
The figure given on page 77 shows a side view of the head, neck, shoulder, and fore limbs, as they should be seen in a perfectly formed animal. On page 82 are side views of the fore quarters of horses, even down to those which easily become distorted from labor or use. In the perfectly formed horse, the neck is muscular and fine at the top, where it joins the head. There is no useless flesh, though where it joins the shoulder it is full and yet fine in proportion. The shoulder is deep, oblique or slanting. The shoulder-blade is high, giving stability to, and at the same time fully supporting, the withers. The breast is prominent, but narrowing to the point where the legs leave the body. The arm is long, muscular, and tapering to the knee. The joints are large, but firm and compact. The fetlocks are long but flexible. The hoofs are rather large, and are round, deep, tough, and sound. It is the shoulder of a saddle horse, of speed, bottom and endurance, that is seen in the cut. Few horses, even of the highest class, possess this perfect ideal conformation. For the harness, the shoulder may be less oblique. The horse of all work, is more rigid and upright in limb and shoulder than the more speedy one; yet the illustrations we give may be taken as the standard in judging a horse intended for every kind of work. The general appearance of the best animals of the various breeds is shown by cuts in their appropriate places in this volume. A comparison will show that while there are differences, yet the rules here laid down will apply generally to all horses, modified only by the differences required to enable a particular breed to perform special labor. The trotting gait, as exhibited in a high-caste roadster, combining style with high action and great and long continued speed, would be execrable in a saddle horse. The springy, nervous action, and the long stride of the elegant saddle horse, would not go far towards pulling a dead weight, however honest and courageous the attempt might be—and we have seen thoroughbreds as honest and courageous at a dead pull as could be desired in a draft horse. While the highly-bred horse, especially the road horse, will fill more places than any other, yet the horseman must seek the animal best suited to his purpose. A study of the various models we present will enable any intelligent person to judge for himself, as well as an expert whom he would have to pay for his services. It should certainly prevent the palming off of any "sorry brute," as is often done upon those who, while scorning intelligent study, imagine they "know all about horses."

VI. Bad Fore-Quarters.

In the illustrations on page 82, the upper left hand figure shows a straight shoulder, the chest heavy, and the limbs placed too far under.

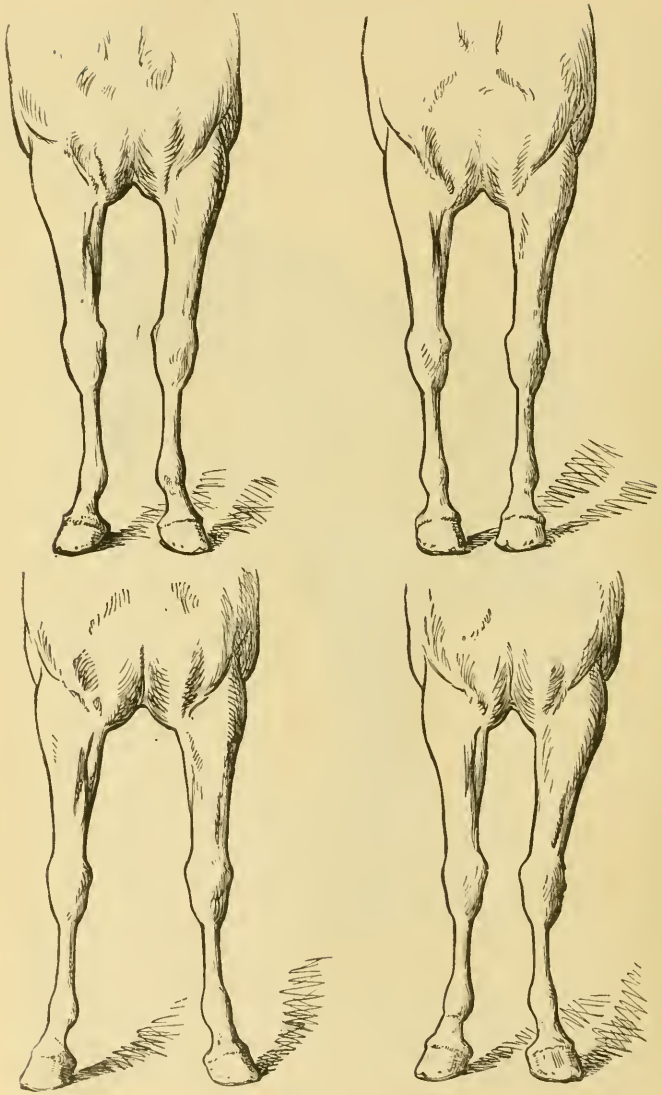
The arm seems long, but this is because it lacks muscular development. The shanks lack strength near the knee and pasterns, and there is a lack of strength generally.

In the upper right hand figure, the shoulder is not only bad, but the legs and pasterns are weak. There is too much length from the hoof to the joint above To the uneducated eye the pasterns might seem flexible. It is, however, the flexibility arising from weakness. The muscles which



SIDE VIEW OF FORE QUARTERS, SHOWING A GOOD SHOULDER. (See Explanation.)

carry the tendons lack strength, and with age the power of holding them in position will decrease. If the reader will turn again to the chapter illustrating the muscular development of the horse he will understand these points better.



FRONT VIEW OF FORE-QUARTERS, SHOWING DIFFERENT BAD CONFORMATIONS.

FRONT VIEW, SHOWING GOOD BREAST AND LIMBS. (See Explanation.)

The left hand lower figure exhibits a shoulder tolerably well placed, but the limbs are set too far under, and the pasterns are too straight, so that the animal appears to stand on his toes, and there is a general lack of muscle and sinew.

The lower right hand figure will convey a good idea of what old age, abuse, hard work and want of care will bring to either of the three pairs of shoulders and limbs just noticed. Abuse and ill-usage might ruin the living representative of the perfect figure on page 77, but the limbs would remain comparatively sound to the last.

VII. The Body as Seen from the Front.

In the illustration on page 79, the neck and shoulders are oval or egg-shaped. The chest seems narrow rather than broad, but this is because the muscular development about the breast bone is ample and full. Observe how grandly the muscle above the arm swells out, and what magnificent muscularity the arm presents with the two great thews running down to the knee. The joints are large and ample, as they should be, but also firm. The hoofs are tough and hard. Look carefully at the white space between the limbs running from the hoofs upwards. See how the neck, gradually rising from the chest, shows strength and a perfect proportion of one part to the other. The joints are compact and rounded, to meet the articulating shank and fetlock bones. The staunch strong hoofs are rather open behind, but show no indication of a flat foot. Set this and the preceding illustrations against the wall, retire until you get a perfect view, study them as an artist would a subject, compare them with the living animal, and, if you buy a horse for breeding or other use, buy as near to the model as possible.

VIII. What a Critical Horseman said.

One of the best authorities of all writers on the horse, a highly educated Englishman, whose estimate of an animal was always made from the standpoint of general excellence, the late Henry William Herbert, in his exhaustive work, "The Horse of America," says:

"The points of the physical structure of a horse on which the most, indeed the whole of his utility depends, are his legs. Without his locomoters all the rest, however beautiful it may be, is nothing worth. Therefore, to these we look first. The fore-shoulder should be long, obliquely set, with a considerable slope, high in the withers and thin above. The upper arm should be very long and muscular, the knee broad, flat and bony, the shank, or cannon bone, as short as may be, flat, not round, with clean, firm sinews; the pastern joints moderately long and oblique, but not too much so, as the excess produces springiness and weakness; the hoofs firm, erect or deep, as opposed to flat, and the feet

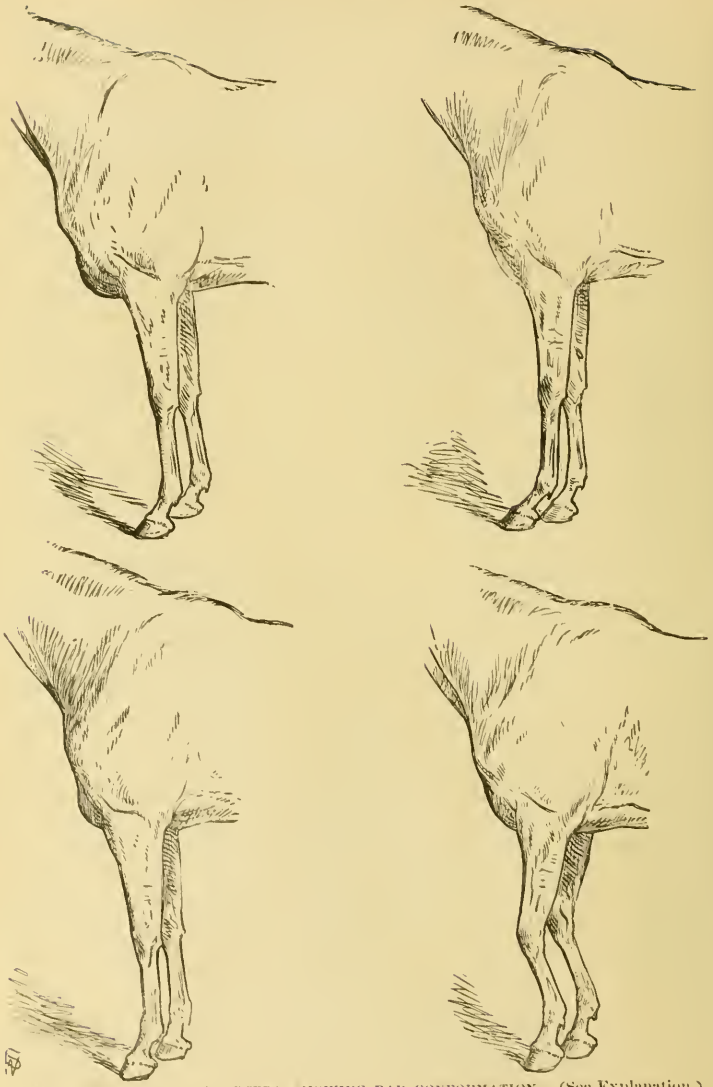
generally large and round. In the hind-legs the quarters should be large, powerful, broad when looked at in profile, and square and solid from behind.

Avoid Straight Hams.—"The hams should be sickle-shaped, not straight, and well let down, so as to bring the hocks well toward the ground. The hocks should be large and bony, straight, not angular and convexly curved in their posterior outlines; the shanks, corresponding to the cannon bones, short and flat, and the hind feet similar in form to the front. The back should be short above, from the point of the withers and shoulder-blade, which ought to run well back to the croup. The barrel should be round, and for a horse in which strength and quickness are looked to, more than great speed and stride, closely ribbed up. A horse can scarcely be too deep from the tip of his shoulder to the intersection of his fore-leg—which is called the heart place—or too wide in the chest, as room in these parts gives free play to the most important vitals. The form of the neck and setting on of the head are essential not only to the beauty of the animal, but to the facility and pleasure of riding or driving him; hence, with an ill-shaped, short, stubborn neck, or ill set on head, the animal cannot by any possibility be a pleasant-mouthed horse, or an easy one to manage.

A Clean, Strong Neck.—"The neck should be moderately long, convexly arched above from the shoulders to the crest, thin where it joins the head, and so set on that when yielding to the bit it forms a semi-circle, like a bended bow, and brings the chin downward and inward until it nearly touches the chest. Horses so made are always manageable to the hand. The converse of this neck, which is concave above and stuck out at the wind-pipe like a cock's wattle, is the worst possible form; and horses so made almost invariably throw up their heads at a pull, and the most exceptionable of brutes, *regular star-gazers*. The head should be rather small, bony, not beefy, in the jowl; broad between the eyes, and rather concave, or what is called basin-faced, than Roman-nosed, between the eyes and nostrils. The ears should be fine, small and pointed; the eyes large, clear and prominent, and the nostrils wide and well opened. A horse so framed cannot fail, if free from physical defect, constitutional disease and vice, to be a good one for any purpose—degree of strength, lightness and speed, being weighed in accordance with the purpose for which he is desired."

IX. Front View Showing Bad Fore-Quarters.

On page 78 are four figures. The upper left hand one shows a fair leg down to the knee; from that point down it is bad. The toes are turned



SIDE VIEW OF FORE-QUARTERS, SHOWING BAD CONFORMATION. (See Explanation.)

very much out ; such a horse has not due strength, and the action will be increasingly bad with age.

The figure to the right shows the reverse of the preceding. The knees are turned out, and the toes are turned in—a horse unsightly, weak and dangerous either to drive or ride.

GOOD HIND QUARTERS. (See Explanation.)

The lower left hand figure is unsightly enough. The legs sprawling, weak, straddling, with turned out toes. Some might think that such a

horse had a sure foundation to stand on; perhaps so, if he always stood at the manger. Such horses might be tolerably sure-footed, if not hard driven, and carefully managed. They are often seen in the hands of persons who will not pay for accurate information. The good judge of horseflesh lets them severely alone.

The lower right hand figure is as bad as possible all over,—a weak-legged, knock-kneed, splay-footed brute that is unserviceable, dangerous and costly to the owner. This conformation often goes with what some call style. Horsemen term them "weeds."

Thus we have carried the reader through a careful study of the front half of the horse. If carefully studied and the information kept fully in mind, the reader may reasonably expect to be able to buy a horse with good fore parts, from an outside view, upon his own judgment.

X. The Hinder Parts Illustrated.

The adage that if the fore-quarters of a horse are strong enough to hold him up, the hind-quarters will carry him forward, is true in a sense, since if a horse is perfect in his fore-quarters, the hind-quarters are pretty sure to be good. Yet the majority of horses if they break down at all do so first in their forward limbs, spavin being one of the principal disabilities of the hind limbs. The real facts are that the proportions of the whole animal must be harmonious, each part assisting the others while at the same time it is doing its own appropriate work. This will be more fully understood by referring to what has been said in the chapters on Anatomy, on the muscular conformation. As already stated, the hind quarters are the real propelling power of the animal. The forward motion is given by successive springs or leaps, very clearly shown when the horse is galloping. Then the fore parts act more in the nature of a balance than either in walking or trotting, or in that artificial movement, the amble or pace. In the last named the change of the center of gravity is from side to side in connection with a slight one front and rear. In walking and in trotting the change of the center of gravity is more equally distributed between the sides and forward center. In running, the change of gravity is almost entirely from front to rear.

XI. The Propelling Power.

If it is to do its work effectively, the propelling power must be provided with a large loin, strong, muscular quarters, great length of hip; strong, dense and necessarily fine bones; strong joints, and flat, wide legs, with sinews steel-like in their strength, and standing out like great cords. It is this great tendinous development that gives the lower limbs the flat appearance, seen in all horses of great power. The bones themselves are not flat; the bones and tendons however combine to form a flat

leg. On page 83 is an illustration of a perfect hind-quarter, seen from the side. On page 86 are four figures showing fair to bad hind-quarters. The horseman, in studying his animal, should observe whether if, when viewed from the side, the horse stands perpendicularly on each foot alike. There should be no straddling-out, or gathering together of the limbs, but he should stand straight, square and distinctly alike on each limb. If he does not stand in this way, move him forward on level ground and observe if, in coming to rest, he assumes the position we have described; if not, something is wrong. Examine him for defects, injured back or sinews, ring-bones and splints in front; and for bone spavin, blood or bog spavin, curb or thorough-pin behind. If he stands as in the figure, page 83, showing good hind-quarters, the horse is right, if free from other blemishes. If the fore-quarters are as shown on pages 77 and 79 side and front view; and, if on looking at the horse from behind, he present the appearance as shown on page 87, you will have to hunt a long time to find his mate.

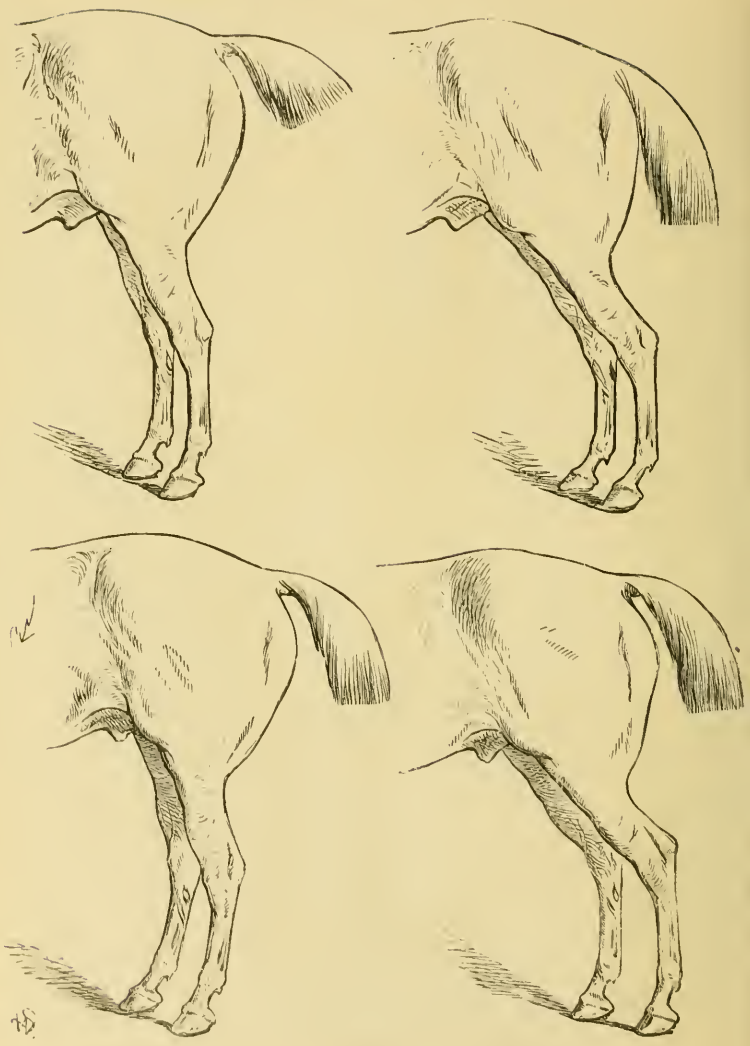
Look Well to the Limbs.—Study carefully whether the pasterns or outline of the hock joints are nearly perpendicular or angular. Examine to find if they show a convex, curved projection or protuberance just above the point of union with the shank bone. If not, there will be little danger of curb, or of a tendency thereto. Avoid a cow-hocked horse, viz: a horse with the hocks drawn in. It is an ungainly and serious malformation, for such an animal will be weak. Do not buy a straddling horse. He may be strong and perhaps fast, but never elegant in his movements. We repeat that no horse is fast because he goes wide apart, though sometimes a horse is fast in spite of this defect. Therefore do not buy a straddling colt in hopes of getting a trotter.

Medium Good to Bad Quarters.—On page 86, are four figures, side views of hind-quarters. Many persons would call the one on the upper left hand side, fine. It is not bad. The buttocks are round, for fat may give a round buttock. But they lack character, real muscular development, and the legs are too straight and far behind.

The left hand lower figure is fair in its general outline, but the animal stands too straight on the pasterns, and the legs are thrown too far forward. Never buy a horse which, to use a horseman's phrase, "can stand in a half-bushel." They are like a horse which, to use a similar phrase, "can travel all day in a half-bushel."

The right lower figure has not a bad quarter. The limbs, however, are badly placed, and the position is cramped.

The upper right hand figure is bad in every way—"goose-rumped," "cat-hammed," weak in the hock and ankle, while the legs are thrown far back to equalize the strain.

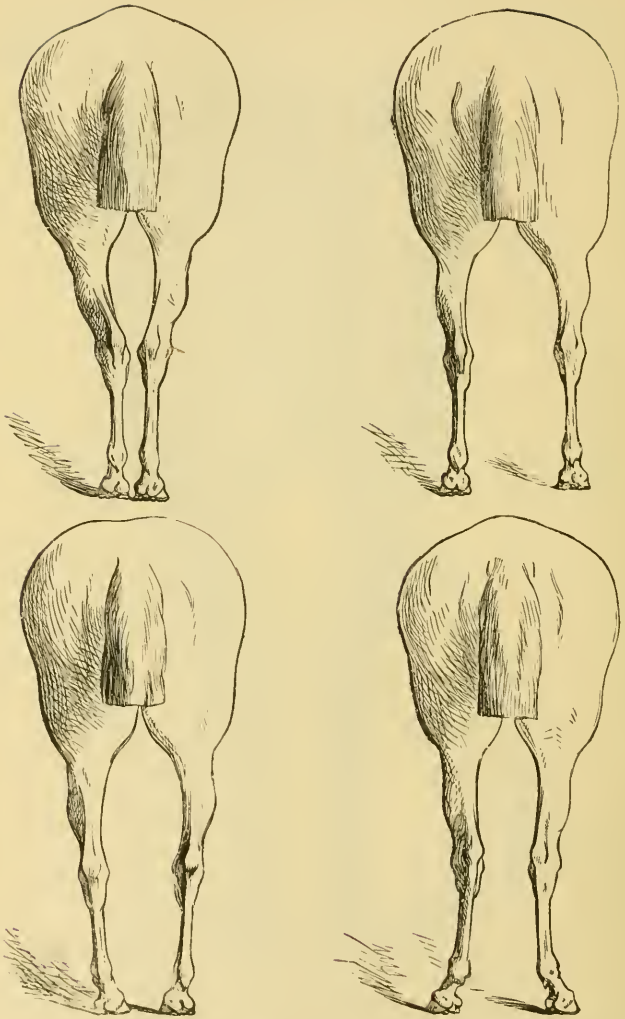


SIDE VIEW OF HIND-QUARTERS—BAD. (See Explanation.)

The Quarter from Behind.—Looking at the horse from behind, the quarters should be full and square. This will be the case if the *gracilis* are perfectly shaped. The gracilis are the muscles which give the pecu-

BACK VIEW OF HIND-QUARTERS—GOOD. (See Explanation.)

liar swell to the inside of the thigh, and are described in the chapter on muscular formation. The outside muscle of the great bone of the leg, (*tibia*) cannot well be too large, and the tendons, connecting with the



BACK VIEW OF BAD HIND-QUARTERS. (See Explanation.)

hock, should be large and plainly visible. The hocks should be large, strong, firm, well knit, smooth and free from blemish. The fetlocks should also be large but round and firm, and the hoofs strong. If the horse is flat-footed he is weak hoofed, and this defect should never go with a horse of strong bone and muscle.

If, in moving forward, the animal lift the feet squarely, and carry them straight forward, without turning or straddling, and if they are set down as squarely and promptly as they were picked up; if the conformation is as illustrated in the several good figures, it is a horse to buy, if you want to pay for a good one, or to keep, if you already possess him. If it be a mare do not fear to breed her to the best sires in the land. She will not disappoint you in her colts, if the sire be as perfect.

As the converse of this we refer the reader to the figures on page 88, showing the gradations, from inferior to bad. The study of these figures should enable one to avoid cow-hocked, pigeon-toed, bow-legged, straddling, or splay-footed brutes.

XII. What the Ancients Knew of Horses.

That the ancients were critical judges of horses, there is no doubt; and that their standard was not far below that of to-day, the following extract from a translation from Xenophon, who wrote more than two thousand years ago, will show. It is also interesting by reason of the accurate advice it gives for judging a horse. The perfect horse of this ancient Greek writer was not a thoroughbred, as we understand the term, but he was a good, strong, well-muscled, enduring horse, and one of fair size. Here is what Xenophon says:

"We will write how one may be the least deceived in the purchase of horses. It is evident, then, that of the unbroken colt one must judge by the construction, since, if he have never been backed he will afford no very clear evidences of his spirit. Of his body, then, we say it is necessary first to examine the feet, for, as in a house, it matters not how fine may be the superstructure, if there be not sufficient foundations, so in a war horse there is no utility, no, not if he have all other points perfect but be badly footed. But in examining the feet, it is befitting first to look to the horny portion of the hoofs, for those horses which have the horn thick are far superior in their feet to those which have it thin. Nor will it be well if one fail next to observe whether the hoofs be upright, both before and behind, or low and flat to the ground; for high hoofs keep the frog at a distance from the earth, while the flat tread with equal pressure on the soft and hard parts of the foot, as is the case with bandy-legged men. And Simon justly observes that well-footed horses can be known by their tramp, for the hollow hoof rings like a cymbal

when it strikes the solid earth. But having begun from below, let us ascend to the other parts of the body. It is needful, then, that the parts above the hoofs and below the fetlocks (pasterns) be not too erect, like those of the goat; for legs of this kind, being stiff and inflexible, are apt to jar the rider, and are more liable to inflammation. The bones must not, however, be too low and springy, for in that case the fetlocks are liable to be abraded and wounded if the horse be galloped over clods or stones. The bones of the shank (cannon bones) should be thick, for these are the columns which support the body; but they should not have the veins and flesh thick likewise. For if they have, when the horse shall be galloped over difficult ground they will necessarily be filled with blood, and will become varicose, so that the shanks will be thickened, and the skin be distended and relaxed from the bone; and, when this is the case, it often follows that the back sinew gives way and renders the horse lame. But if the horse, when in action, bends his knees flexibly at a walk, you may judge that he will have his legs flexible when in full career; for all horses as they increase in years increase in the flexibility of the knee. And flexible goers are esteemed highly, and with justice, for such horses are much less liable to blunder or stumble than those which have rigid, unbending joints. But if the arms, below the shoulder-blades, be thick and muscular they appear stronger and handsomer, as is the case also with a man. The breast also should be broad, as well for beauty as strength, and because it causes a handsomer action of the fore legs, which do not then interfere, but are carried well apart.

"Again, the neck ought not to be set on like that of a boar, horizontally from the chest; but, like that of a game cock, should be upright toward the chest and slack toward the flexure; and the head being long should have a small and narrow jaw-bone, so that the neck shall be in front of the rider, and that the eye shall look down at what is before the feet. A horse thus made will be the least likely to run violently away, even if he be very high-spirited, for horses do not attempt to run away by bringing in, but by throwing out their heads and necks. It is also very necessary to observe whether the mouth be fine and hard on both sides, or on one or the other. For horses which have not both jaws equally sensitive are likely to be too hard-mouthed on one side or the other. And it is better that a horse should have prominent than hollow eyes, for such an one will see to a greater distance. And widely opened nostrils are far better for respiration than narrow, and they give the horse a fiercer aspect; for when one stallion is enraged against another, or if he become angry while being ridden, he expands his nostrils to their full width. And the loftier the crest, and the smaller the ears, the

more horse-like and handsome is the head rendered; while lofty withers give the rider a surer seat, and produce a firmer adhesion between the body and shoulders.

"A double loin is also softer to sit upon and pleasanter to look upon than if it be single; and a deep side, rounded toward the belly, renders the horse easier to sit, and stronger and more easy to keep in condition; and the shorter and broader the loin, the more easily will the horse raise his fore-quarters and collect his hind-quarters under him in going. These points, moreover, cause the belly to appear the smaller; which, if it be large, at once injures the appearance of the animal and renders him weaker and less manageable. The quarters should be broad and fleshy in order to correspond with the sides and chest, and, should they be entirely firm and solid, they would be the lighter in the gallop, and the horse would be the speedier. But if he should have his buttocks separated under the tail by a broad line, with a wider space between them, by so doing he will have a prouder and stronger gait and action, and will, in all respects, be the better on them. A proof of which is to be had in men, who, when they desire to raise anything from the ground, attempt it by straddling their legs, not by bringing them close together."

XIII. What One Need Not Expect.

We have, in the foregoing chapters and in this, illustrated and explained the several parts of the horse and his excellences so fully that none need go astray in studying the points of an animal. If these illustrations and explanations are borne in mind, a horse may be accurately judged by his actual bone and muscle, whether fat or lean. The intelligence of an animal may also, by the same study, be accurately estimated. A fat horse is generally smooth and round, and many a sorry brute has been fattened for the purpose of palming him off on the unwary.

We need not expect a fat horse to go right to work, and keep fat. The horse for hard work must first be brought into condition, and this means working off the mere fat, and getting down to bone and muscle. We must not expect a horse to be useful because he is big, unless he is wanted for heavy draft. If the draft is heavy it should be slow, and thus the horse may be big and also keep fat. For general work, the medium-sized horse is the best. A pair of horses, each 16 hands high and weighing 1,200 pounds are well suited for city teaming and other ordinary draft, except the hauling of heavy trucks. A fifteen-and-a-half hand, 1,100-pound horse is suitable for the road, and if one-half hand less in height and correspondingly light in weight, say 1,000 pounds, he will do quite as well in single or double harness. Sixteen-hand horses are also suitable for coaches and heavy carriages, while the lighter animals will

serve as double teams for road driving. If they are good ones, free from vice, well-matched, and perfectly trained, do not be afraid to ask a good round price for them. But do not expect to get a large price for a cheap horse, nor need you expect to buy a perfect horse for a low price. He may, however, be cheap at any price your purse may afford. In buying, keep constantly in view what you want the animal for, but do not buy any horse because he happens to strike your uneducated fancy. You certainly will not do so, if you have carefully studied the preceding chapters.

CHAPTER V.

THE HORSE'S TEETH; AND HOW TO TELL HIS AGE.

I. THE DENTAL FORMULA.——II. THE TEETH ARE THE TRUE INDEX OF AGE.——III. THE FOAL'S TEETH.——IV. DIFFERENCES BETWEEN THE TEETH OF FOAL AND HORSE.——V. ALLOWANCES TO BE MADE.——VI. ILLUSTRATING BY THE CHART.

I. The Dental Formula.

The names and numbers of the teeth of the horse are as follows: *Incisors* (front teeth or nippers) $\frac{6}{6}$; *canine*, or tushes or hook teeth, in the male only, $\frac{1}{1}\,\frac{1}{1}$; *molars*, or grinding teeth $\frac{6}{6}\,\frac{6}{6}$, making forty in all. This is for the male. The mare has but thirty-six, since she lacks the tushes, or canine teeth. These sometimes also fail to develop in the gelding.

II. The Teeth are the True Index of Age.

Almost every horseman is supposed to be able pretty accurately to determine the age of his horse. Among old horses, the eyes, the sharpness of the jaw bones, and the bones of the tail, are, by many, claimed to give a clear indication of the animal's age. But these are all fallacious. They may be, and in fact are, helps, but the only true indication is given by the teeth; and to the educated eye, these are sufficient to tell the age accurately up to eight years, and thereafter with sufficient accuracy for all practical purposes. From the time the colt is foaled until death, the teeth are constantly undergoing change. Hence, if a person carefully studies the changing conditions of the teeth, he may accurately determine the age either of the colt or horse. The incisors furnish the chief indication, but to some extent the tushes or hook teeth, and the grinders give valuable assistance, since they may correct, or corroborate, what is seen in the incisors. To assist in this study we give in this chapter, a chart showing, from accurate drawings, the precise appearance of the teeth from colt-hood up to the age of twenty-nine years. This chart, with the accompanying explanations, will enable any person of intelligence to judge the age of a horse, even though he have been "Bishoped," as the making of false marks on the teeth is called, from the name of the rascal who invented the practice.

III. The Foal's Teeth.

When just foaled, the colt has no front teeth, but in most cases twelve back teeth appear just above the gums. At from two to three months of age four central nippers appear, two in each jaw; in six weeks another tooth comes out on each side of these, or four more all together; and

at the age of eight or nine months the four corner nippers are seen. At this age the colt has all his teeth, upper and lower. They are the foal's teeth and are changed by the fifth or sixth year for the permanent or horse's teeth. As before stated, the three front double pairs of grinders are seen at birth, and are afterwards changed. The fourth double pair, those seen from the eighth to the ninth month, are the first that remain stationary, and are found in the mouth of every year-old colt. The fifth double pair (fifth four), appear in the second year, while the sixth double pair generally come in the fourth or early in the fifth year. These three double pairs of back teeth remain unchanged, as also do the tushes or hook teeth. The tushes do not appear at a fixed age; sometimes they are seen in the stallion at the end of the third year, and sometimes not until the middle or the end of the fourth year; sometimes they do not come until the fifth year, and occasionally not until the sixth year. The mare never has them, and in the gelding they occasionally fail to develop.

IV. Differences Between the Teeth of Foal and Horse.

The difference between the nippers of the foal and those of the horse should be carefully studied. They differ, (1) by their regular conical formation; (2) by a narrow contraction called the neck, visible almost in the center of the body of each tooth, while nothing of the kind is seen in horse-teeth; (3) by their smaller size, even when full grown. The milk teeth (those teeth which are shed), taken from the jaws of dead foals and compared with horse-teeth similarly obtained, are found to be only about half as long as the latter. The breadth is not to be depended on, since the milk teeth of large foals appear almost as broad as those of small horses. When the nippers become horse-teeth they form a great contrast to the middle and corner teeth. The size of these last will at once show them to be milk teeth. (4) The outer surface of the foal-teeth is smooth and striped with brown, while on horse-teeth the same surface is divided by a dirty yellow indentation inclining toward the center, which is sometimes double upon the upper teeth.

A study of the nippers of the horse taken at different ages will materially assist the beginner. The incisor and all other teeth, consist, first of the enamel or biting or grinding surface; then of a bony substance, and lastly of the root imbedded in the jaw. The teeth of the foal as well as of the horse, are constantly but slowly worn away in the act of feeding. If the animal feed on sandy or gritty, and especially on short pasture, the teeth are worn faster; if he feed on longer grass, and on the prairies the teeth wear slowly. Horses kept in the stable, have less wear on the nippers than those which have to forage for themselves. Thus in old age the teeth, once two and a half or three inches long, will

finally be not more than half an inch in length, and the breadth decreases in about the same proportion. There is this difference, however, between the teeth of the foal and those of the horse. The thickness and breadth of the foal's teeth are constantly decreasing from the grinding surface or enameled part toward the root, while the teeth of the horse decrease by contraction. The grinding surface of a nipper, which has not been used, is three times as broad as it is thick, and is hollowed from the top downward, the hollow having two sharp edges inclosing it. This hollow is called the mark. In the center of this mark the kernel is seen. This is a tube commencing at the end of the root, and contains the nerve, which must not be confounded with the mark. The mark is the outer depression, lying next to the sharp edges. The inner cavity is a funnel shaped socket of enamel, a hard shell. Around this, and inside the outer shell, is a thick fluid, which remains as long as the tooth retains sensibility, but becomes by degrees a gray matter. Figure 8, on the chart, will illustrate this.

Again, the outer edge of an incisor (nipper) always rises a line or two —a line is the twelfth part of an inch—above the inner edge. Thus, at first, only the outer edges of the upper and lower nippers meet, and the inner edges do not touch until the outer edges are sufficiently worn to allow them to meet, or until they are of an equal height. Horse-teeth reach this condition in about a year. When the colt is two-and-a-half years old, the teeth begin to shed, and the permanent or horse-teeth begin to appear. The chart, Fig. 7, A, will explain this growth, and Fig. 7, B, will show still further development and wear.

The grinders have but little to do in determining the age of a horse, but still they assist thereto. The crowns of the grinders are entirely covered with enamel on the top and sides, but the grinding of the food wears it away from the top and there remains a compound surface of alternate layers of crusted enamel and ivory, which serve, in grinding the food, to fit it for the stomach. Nature has therefore made an additional provision to render them strong and enduring.

To illustrate this we represent a grinder sawed across. The fine dark spots show bony matter. The shaded portions show the enamel, while the white spaces represent a strong bony cement uniting the other parts of the teeth. In the dental formula at the beginning of this chapter we have given 40 as the number of teeth for the stallion, and 36 for the mare, the stallion having 4 hook teeth, or tushes (*canines*), which the mare lacks. Sometimes, however, the mare has imperfect teeth in the portion of the mouth corresponding to that of the tushes in

the stallion. Twenty-four of the teeth in both horses and mares are situated in the upper part of the mouth, that is back of the tushes, or above the lips. These are the true teeth or grinders (*molars*). They are divided into six double pairs, counting from below upwards. Those situated next the nippers of a mare, or the tushes of a horse, and in all the four rows, are called, first; those next, second, and so on until the last double pair are reached, which are called back teeth. There are also sometimes in young horses imperfect teeth, just before the grinders, ignorantly denominated wolf-teeth, and are supposed to cause blindness. They sometimes do produce irritation of the eyes, from inflamation by sympathy, and should be removed with the forceps.

In the lower portion of the mouth, or that portion surrounded by the lips, there are twelve teeth, six in the upper jaw and six in the lower jaw. These are the nippers (*incisors*). They occupy the entrance to the mouth, and each six are in the form of an arch. These teeth are divided into three pairs in each jaw. The four central ones, two in each jaw, are called "nipping teeth," or nippers. The two outside teeth in each jaw are "corner teeth," and those between the corner teeth and the nippers are called middle teeth. It is the attrition of the upper surface of these teeth on each other in eating that causes wear, and thus enables us to judge with tolerable accuracy of the age of the horse,—usually to a certainty up to eight or nine years; quite closely up to fourteen or fifteen years, and approximately up to the age of twenty-five or thirty years. The nippers (*incisors*) of the upper jaw are broader and thicker than those of the lower jaw.

The tushes (*canines*) are placed singly, one in each side of the upper and lower jaws, between the corner teeth and the grinders, but nearer the corner teeth of the upper than of the lower jaw, so that they never come in contact with each other. The age at which a horse attains the full number of teeth is from four-and-a-half to five years. He is then, in horseman's phrase, said to have a "full mouth." From this time onward the more a permanent incisor loses in length by wear, the more it loses in width, and the nearer the worn surface approaches the root, becoming narrower and thicker in appearance. Another fact is worth remembering; as the horse advances in age the gums recede, so that a smaller portion of the teeth is covered. Hence the reason that the teeth become narrower and thicker with age. It is from being uncovered; and hence again, aged teeth are longer in their visible portions than those of younger horses.

V. Allowances to be Made.

Large horses have larger teeth than small ones. The rules given are for horses of medium size. Some horses have harder bones than others,

and harder teeth. The difference in food and in pastures has already been spoken of. Some breeds of horses develop more slowly than others. Spanish horses develop slowly. Again, a false system of feeding will mature an animal sooner than if he were fed in the ordinary way. But animals which develop slowly generally live longer than those which develop quickly, so that in the end, the years of service, judging from the teeth, are about the same. The slowly-developed horse is, however, older by perhaps one or two years than would appear from his teeth. In like manner, the age of a mule is difficult to determine with exactness, though it may be determined closely enough; and a mule of twelve or fifteen years of age, if he has not been injured, has many years of service yet in him.

VI. Illustrating by the Chart.

Figures 2, 3, 4, 5, 6 show how the age of a colt may be determined until he is two years old. The following further explanations, taken in connection with the chart from Fig. 7 to Fig. 46, inclusive, will show how the age, from two to thirty, can be ascertained.

The incisors being the reliance, our remarks must be understood to refer chiefly to them. The length of the tooth of a horse of medium size is three inches, or thirty-six lines. After the changed tooth has arrived at its proper length, it shoots up a line regularly every year, and if the teeth stand right the grinder is worn off a line every year. It is also, as has been said, worn off in both width and breadth, so that the grinder becomes, from year to year, shorter and smaller, as shown by the chart.

If, however, the teeth stand too far forward, (irregular teeth, see chart, Fig. 41), they do not wear down in the same proportion as they shoot upward, and they become very long. The age in this case can be ascertained, with ease and exactness, by observing directions given under Fig. 41, and noticing with care the following points: At the age of five years, the corner teeth of the lower jaw have grown up five lines above the gum; each middle tooth seven lines; and each nipper nine. At eight years and older, each corner tooth of the same horse projects only four, the middle teeth six, and the nippers eight lines above the gums. This is absolutely necessary to be taken into account, because it is the only means by which one can determine with certainty the age of a horse whose teeth have become longer than they would have been if set right, and wearing regularly.

Deceptions may be practiced with very thrifty young horses, when it is desirable to make them appear of suitable age for work or for breeding, by knocking out the incisors a year sooner than they would naturally

change themselves. If a purchaser suspects deception, he can determine the matter by closely examining the remaining teeth. If the nippers have changed, and the inner edges of the corner teeth have not yet come into contact, the foal is but one year old—and so on for succeeding years.

The opposite cheat, that of trying to make a horse appear younger than he really is, by burning artificial marks in upon the teeth—can be detected by closely examining the enamel and the effect of the mark upon it. When a horse has reached an advanced age, say twelve to twenty, the enameled surface has become so minute that burning in so large a mark as is found in horses considerably younger would disturb the whole enamel, and so leave a means of detecting the fraud.

In the case of crib-biters, that wear out their teeth prematurely, and so appear older than they really are, examination must be directed to the corner teeth, which are seldom injured; or if the corner teeth prove to be injured, deduct from the apparent age as many lines as are wanting to make the teeth of the natural length. To feed constantly, from weaning time, upon hard, unshelled corn, sometimes produces the same effect as crib-biting, and the same directions must be followed in forming an estimate.

A short vocabulary, by reference to which the reader may more readily apprehend the meaning of the terms employed in the ensuing chart, is appended.

Incisor.—A cutter; a foretooth which cuts or bites. In the horse, those twelve teeth, six in the upper jaw and six in the lower, which are surrounded by the lips, are called incisors.

Grinder.—As used in the present chapter, it denotes the hard, grating, upper portion of the front teeth.

Line.—One-twelfth of an inch.

Mark.—As used with reference to horse-teeth, it denotes that depression in the grinder lying inside the sharp edges and adjacent to them.

Nippers, or Incisors.—Those two teeth in each jaw that occupy the middle of the semi-circular row.

Corner Teeth.—The two outer of the six front teeth in each jaw.

Middle Teeth.—The teeth between the nipper and the corner teeth.

Tushes, or Hooks.—Four teeth, two in each jaw, situated over the corner teeth or beyond the incisors, reckoning from the front of the lips, and having a cylindrical and somewhat hooked shape.

Milk Teeth.—The front teeth of a foal which appear at about three months of age, and are cast within two or three years.

Fold-out Placeholder

This fold-out is being digitized, and will be inserted at future date.

CHAPTER VI.

BREEDS OF HORSES AND THEIR CHARACTERISTICS.

I. INFLUENCES OF COUNTRY AND CLIMATE.——II. THE FARM HORSE.——III. THE CLYDESDALE HORSE.——IV. THE NORMAN-PERCHERON.——V. THE PERCHERON OF TO-DAY.——VI. THE CONESTOGA HORSE.——VII. ROAD HORSES.——VIII. TROTTING HORSES.——IX. HUNTING HORSES.——X. LIGHT DRIVING HORSES.——XI. COACH HORSES.——XII. THE CLEVELAND BAY.——XIII. PONIES.——XIV. THE VERMONT DRAFT HORSE.——XV. THE NARRAGANSETT PACER.

I. Influences of Country and Climate.

Every country of the earth has a breed or breeds of horses, each with its peculiar characteristics; and the horses of Asia, Africa, Europe and America have their points of difference as strongly marked as do the human inhabitants of these grand divisions of the globe. Besides the peculiarities resulting from local influences of climate, topography, etc., the horse has others which are due to the treatment and training received at the hands of his masters, since from a long course of artificial breeding and feeding, he has become a purely artificial animal, except among barbarians or savage tribes. Among savages, his hard environment has made him degenerate—has in fact reduced him to a condition inferior to that of the horses found running wild where they have increased and multiplied on pasturable lands, after having escaped from domestication. The horse in the latter condition has already been sufficiently mentioned in the first chapter. In the present chapter we purpose to notice only the more important breeds of civilization, or those that have acquired celebrity for their valuable qualities.

II. The Farm Horse.

The farm horse is the most important member of the equine family, for the reason that he is used by the largest number of people, and is employed in the production of that which sustains life in man. The farm horse cannot lay claim to the dignity of a distinct breed, as he is composed of mixed blood, and is dependent for whatever valuable qualities he possesses, upon the intelligence of the people by whom he is bred. The majority of farm horses are inferior to the more respectable of the fixed breeds, though of late years they have steadily increased in valuable qualities, through the introduction of superior blood; and in many districts they are, as they should be, bred with reference to their sale for particular uses, after they have partially paid for their care by their labor on the farm.

The Horse of All Work.—The farm horse should essentially be a horse of all work, of good style and action, and of about 1200 pounds weight.

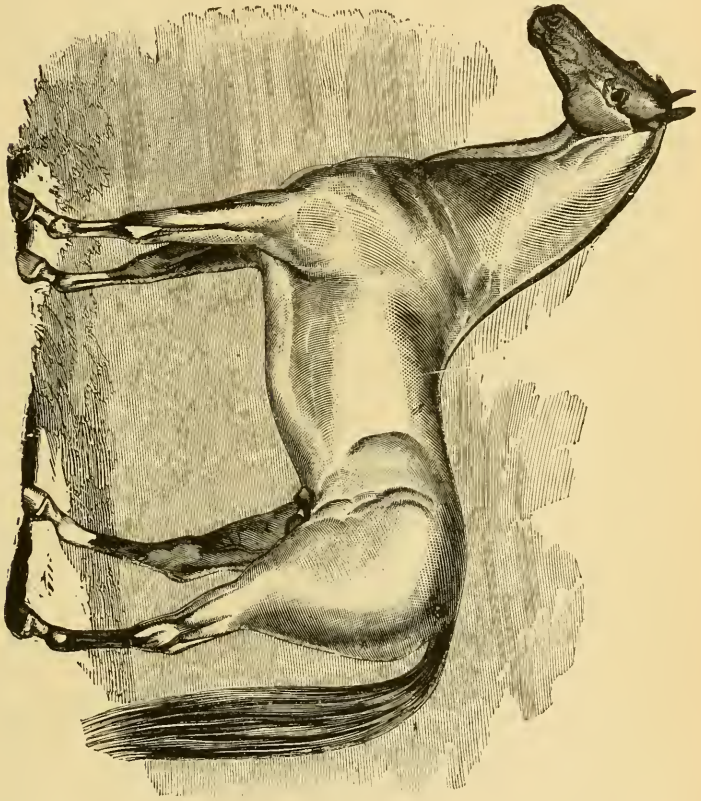
Such horses will be able to do anything that may be necessary to be done about the farm, plowing, reaping, hauling, or drawing the family carriage to church. When of suitable age they will bring good prices, the

A Good Horse for Light Work.

best of them for use as carriage horses, and others for anything except heavy draft in cities, for express work, drawing omnibuses and other labor, requiring style and action, combined with strength. The figure

page 79 front view, and page 83 side view, and page 87 back view of hind quarters will illustrate our meaning.

Light Farm Horses.—There is another horse that may well find a place on all large farms, a horse about fifteen hands high and weighing



"GOLD DUST."

from 950 to 1050 pounds. Such a horse as this is called, in England, a cob, a square-built, active animal, good for the saddle and all light work. Such a horse is represented on the preceding page. The tail, however, should never be docked; for docking is a barbarous practice, and one now

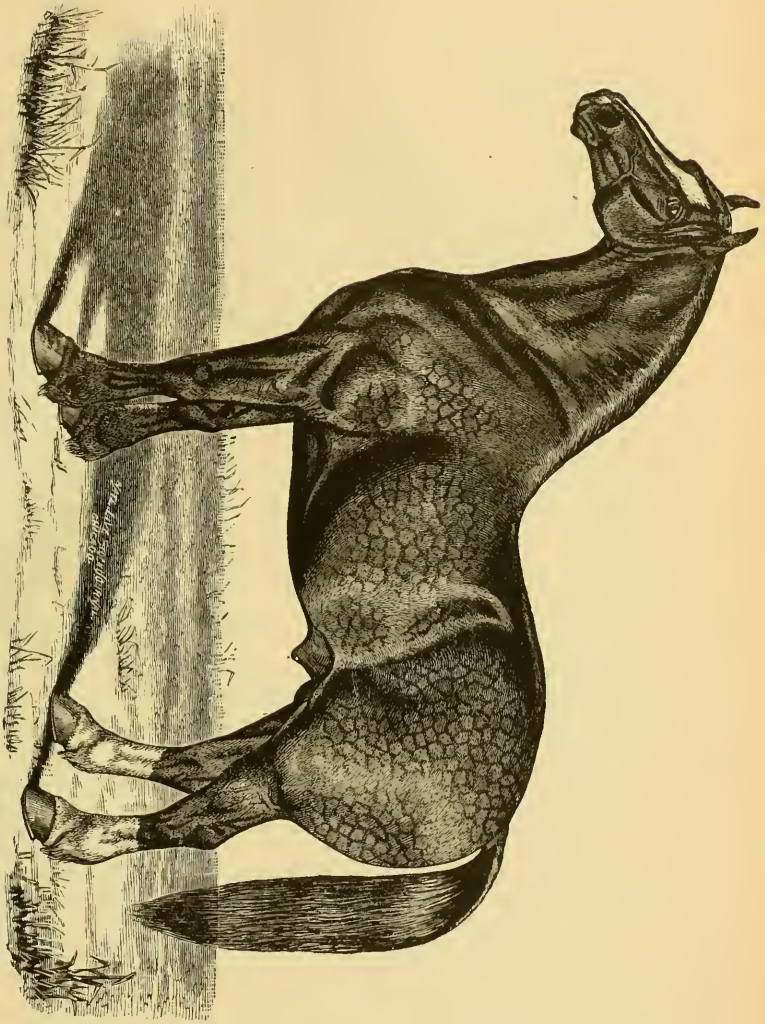
happily gone out of fashion. The Morgans, or rather their crosses, when bred up to the weight last mentioned, make admirable horses of this class.

The Gold Dust Horses of Kentucky.—The Gold Dust Horses, which were originated by breeding from Morgan stallions on good thoroughbred mares, and carefully selecting for generations, make admirable light farm horses. High-strung, elegant, fast-going, staunch, and able for all light work on the farm, either for the saddle or harness, as light driving buggy horses in single harness, or for the light carriage in double harness, they are most excellent animals.

III. The Clydesdale Horse.

Another class of horses that may be made profitable on the breeding farm are what are known as draft horses proper. In the United States, the best representatives of this class are the Clydesdales and the Norman-Percherons. The Clydesdales are an English-Scotch breed of great power, bone and substance, and are capable of drawing immense loads. In Canada there are many excellent representatives of this breed, and in the West they are attracting more and more attention every year. The West of Scotland has long been famous for its excellent draft horses. Their origin is probably due in part to the blood of Flemish mares, though but little is authentically known of their ancestry. Whatever their origin may be, it is certain that they have made Scotland famous for its draft-horse stock, and much of the excellence of the draft horses of the North of England, where the Clydesdale originated, is due to an infusion of this Scottish blood. In England these heavy horses are useful to farmers in working their tough clay soils. In the United States, especially in the West and South, the alluvial nature of the soil does not require such strength of team in plowing; but the vast amount of hauling to be done in and near cities, where the railroad and steamer traffic of the country centres, will always cause a demand for large, able-bodied draft horses.

Points of the Clydesdale.—The jaw is broad and strong, and the muzzle, though neither well developed nor fine, is provided with large nostrils capable of being widely dilated. The eye, though mild, shows courage and vigor. The forehead is broad between the eyes, and capacious. The ears are rather long, and by their intelligent motion indicate activity. The head is well set on the neck, and the neck, as it swells to the shoulder, is massive, with great development of muscle on top. The shoulder is tolerably oblique, fully so for a draft horse. The breast is full, broad and strong. The leg is long from the arm to the knee, and short from the knee to the fetlock. The forearm is amply provided with



CLYDESDALE STALLION.

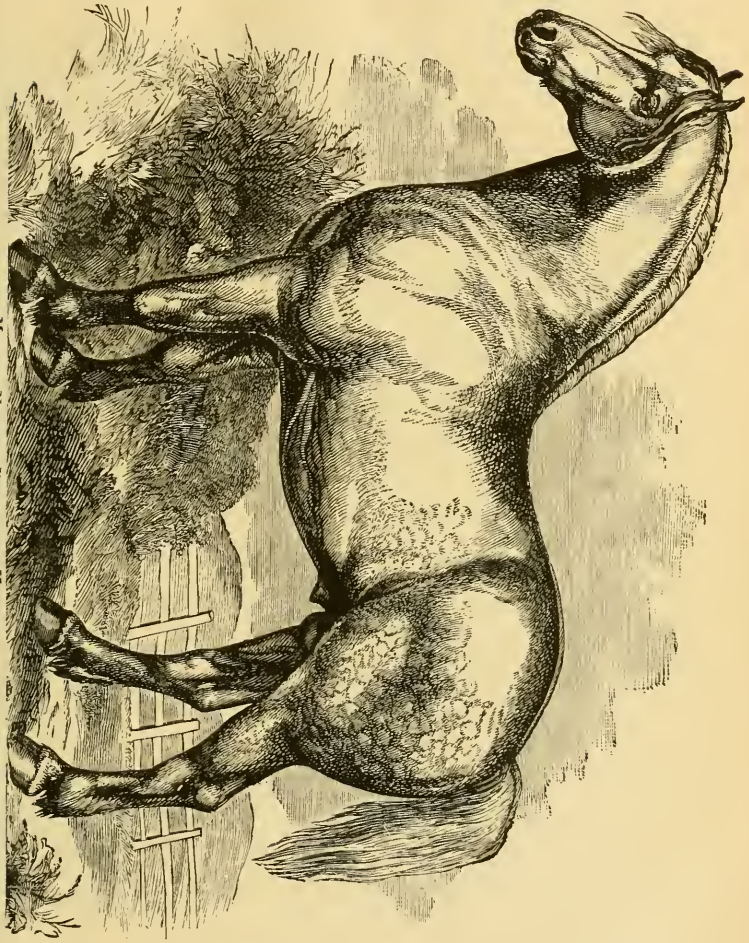
muscle. The knees are large and bony, and from the knee to the fetlock, and from the hock down, the limb is covered with long hair; at the fetlock the hair becomes thick and shaggy. The back and body of the Clydesdale can hardly be called symmetrical, yet the barrel is round, with the ribs extending well back toward the hip. The quarters are broad and low, with muscular thighs and large, clean, broad, well-developed hocks. The lower limbs are flat, as they will be in any horse well developed in muscle and tendons. The hoofs, large, tough, wide, are joined to oblique pasterns. The characteristic color of the Clydesdale is brown with white marks. The height is about sixteen and a half hands; and both in walking and trotting there is a majesty about their movements, showing the power that nerves their action.

IV. The Norman-Percheron Horse.

Norman-Percheron horses are now generally divided into two classes: the Norman, a heavy, muscular, closely-built animal of great bone and muscle, weighing sometimes 2,200 to 2,300 pounds, and the Percheron, a lighter, cleaner built and more active animal, attaining a weight up to 1,800 pounds. Both these strains of Norman blood are among the best of draft stock ever introduced into America. They are superior in some respects to the famous Conestoga horse of Pennsylvania, now practically extinct. Much has been written about these excellent animals, both by partisans and by those who have investigated their history with a view to arrive at the real facts in relation to their ancestry. On the one hand it is contended that they arose from a cross of the Arabian upon the heavy native horses of Normandy; and the defeat of the Saracens by Charles Martel, in which great numbers of their admirable cavalry horses fell into the hands of the French, is cited in support of this view. Many of these Saracen horses, it is said, were brought to Normandy and to La Perche, and hence the commingling of blood which resulted in the present admirable breed. The old Norman war horses were heavy, bony, slow, but strong, and capable of enduring much hardship. They were admirably adapted for their day, since they were capable of carrying a knight in his heavy armor.

Again, it is asserted that the Norman horse is descended from a race then peculiar to Brittainy, and used for draft, rather than for war. Another writer asserts that the Percheron is descended from a remote cross between the Andalusian, mixed with the Morocco barb, and again crossed upon the Norman, because, it is said, the Norman was too slow, and the Andalusian too light, for a knight in full armor. The old Norman horses are said to have transmitted to the race their great bone and muscle, while the Arab, or Andalusian, or whatever the cross may have been,

added spirit, action, speed and bottom Whatever may be the facts as to their origin, both the sub-families of the Norman-Percheron combine



MODERN NORMAN-PERCHERON HORSE.

the strength of the old Norman barb with something of the speed of the Arabian, and are capable of carrying great weights and of drawing heavy

loads at a fair rate of speed. A pair of the lighter Perche horses (called in France Diligence horses, from their use in drawing the coaches of this name) are capable of going at a speed of seven or eight miles an hour.

These horses may now by regarded as having become a fixed race, capable of reproducing itself perfectly, unchanged, and without deterioration through generations, when pure sires are bred to pure dams. Bred to inferior mares, the stallion marks his impress wonderfully upon the progeny, and the pure mares also transmit their characteristics in the same wonderful manner.

V. The Percheron of To-Day.

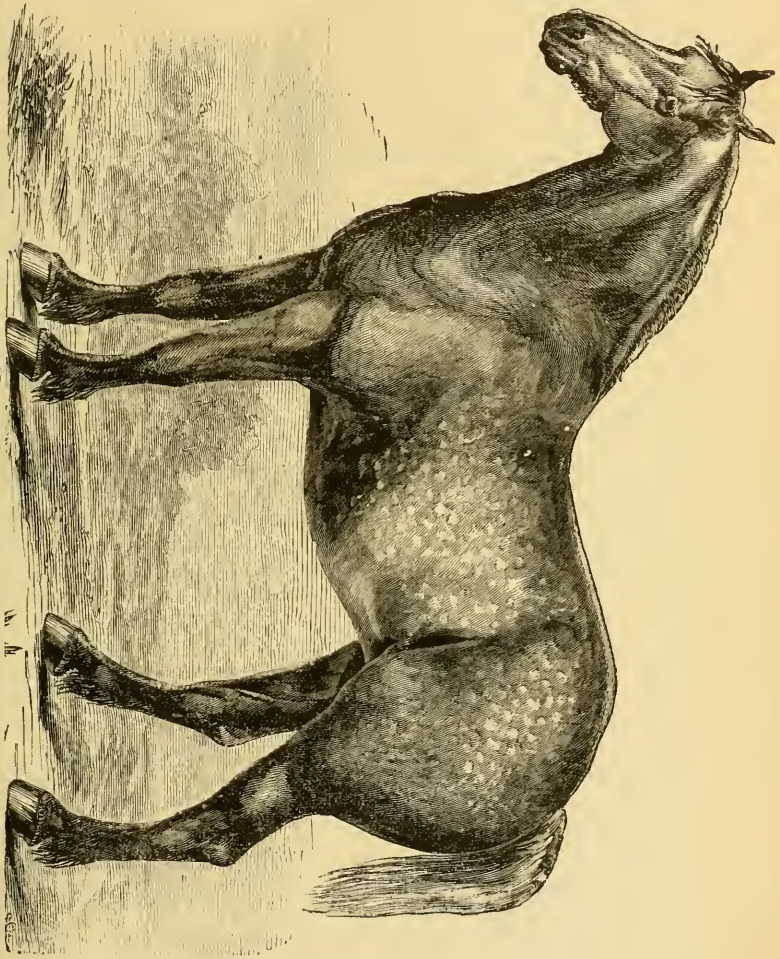
The Percheron makes a capital cross upon any of the large, roomy mares of this country. When the Percheron is bred to this kind of dams, the progeny will possess great size, and will partake essentially of the qualities of the sire. If this progeny is again bred to a pure sire, the result is a three-quarters-bred horse that is but little inferior to the Percheron in all that constitutes power and capability for work.

The Percheron is not what would be called a fast horse. He is not suited for pleasure driving, and yet he is capable of making long journeys at a speed fully equal to that of horses of more pretentions to speed. An instance is given where 58 miles out and 58 miles back was accomplished by a Percheron horse, in two days, the traveling time out being four hours and two minutes, while in returning the time was four hours, one minute and a half; and this without being urged with the whip. Again, a horse of this breed was driven 55 3-5 miles over a hilly and difficult road in four hours and twenty-four minutes, without distress to the animal.

In outward appearance the Percheron presents a head that is not long, with broad brow and slightly dished face, showing intelligence, in which respect he resembles the Arabian. The neck is of fair length, strong, muscular and well-arched, but, like the head, well proportioned to the close-ribbed, round-barreled, short-backed body. The hind-quarters and shoulders are muscular, the lower part of the leg short, hairy and possessing immense tendons. The hoofs are hard, sound, free from disease; but the Percheron is somewhat inclined to be flat-footed. The height is from fifteen to sixteen hands, though many excellent specimens of the breed are somewhat under fifteen hands, especially the lighter Percheron proper. The same description will apply to the Norman proper, except that he is larger and somewhat coarser. Their general color is gray, running from iron-gray to the handsomest dappled gray.

So difficult is it to draw the dividing line between the Norman and the Percheron, that the editor of the Percheron-Norman stud book seemed undecided just what, and what not, to admit into the stud book. Hence

the plan was adopted of giving a full account of the breeding, and crosses, so far as obtainable, and admitting to registry all stallions and



NORMAN-PERCHERON MARE.

mares imported from France as Percheron, Norman, Percheron-Norman, or Norman-Percheron.

VI. The Conestoga Horse.

It is unfortunate that the Conestoga, one of the very best of American horses for draft, for all work in fact on the road or on the farm, should have been allowed to become extinct. Strong and able in every respect, a handsome, quick-stepping animal, and as honest as an ox at a dead pull, the Conestoga horse possessed qualities which entitled his breed to perpetuation. His original home was the Conestoga Valley, of Pennsylvania, and hence the name. This valley was originally settled by Germans, who undoubtedly brought with them the heavy German and Danish horses of their native land. Under the ample feed and genial climate of the Conestoga Valley, these foreign horses were, by careful selection, and an occasional dash of the staunch thorough blood of those days, developed into a race of horses ranging from sixteen to seventeen hands in height, weighing from 1250 to 1500 pounds, and proving to be among the most valuable horses ever known for drawing great loads over hill and mountain. A cross of the Cleveland Bay upon large, round-barrelled, roomy mares might again result in something like this horse. The experiment would be well worth the trial by breeders, who have the will and the years before them to originate a breed of horses, that would be capable of doing any work, from deep plowing, to wagoning and heavy carriage work. Though the Conestoga is no longer bred in purity, there are yet many mares in Pennsylvania descended from this stock, which if crossed with the Cleveland Bay, as we have known him, would, the breed being carefully perserved in, produce a stock of horses possessing most of the valuable qualities of the Conestoga. There are many such horses, in the pastures of Ohio and Pennsylvania. They are high headed, rather long in the limbs, not quite good in the barrel; but, if bred as we have described the outcome would be most satisfactory. The Cleveland Bay is not really a draft animal, but is most excellent as a horse of all work, and will be described further on.

VII. Road Horses.

Many persons get their ideas of what a carriage horse, and especially a driving horse, should be, from English books, and from travelers who have visited that country. So far as action for show, in harness and the saddle, are concerned, they are admirable models, omitting their docked tails, which, are happily going out of fashion there; and which, in this country of generally dry roads and stinging insects, are not to be tolerated at all. The model English roadster is a horse in high condition for service, not overloaded with fat, but in a condition of muscular strength and ability that would be difficult to better. A horse for similar road service should be 15 to 15 1-2 hands high, of good style, and well-muscled throughout. If he be half to three quarters-bred from accepted

trotting families, so much the better. In fact, in the United States, as has for many years been the rule in England, the road horses of the better class, are strongly imbued with thorough blood. Such were the Morgans, and such are the Gold Dusts, while many gentlemen's driving horses now-a-days are closely bred to the blood of Hambletonian, Bellfounder, Abdallah and other famous getters of horses for the trotting course. In another part of this work will be found portraits of the American type of trotting horses, among them Goldsmith's Maid, and the highly-bred roadsters. The road horse should not only be a horse of good substance in bone and muscle, but he should also be an animal of fine style, a quality which is not always found in the trotting horse of the race course. If he can go fast and safely with high action, it is better; but style he should have, and his temper must be without fault. His head must be light and held well up, the limbs strong and clean, the shoulders and pasterns oblique, and having that springy, nervous action characteristic only of high breeding.

VIII. Trotting Horses.

"The trotting horse" of the turf has appropriated the name because he is *par excellence* the fleetest and most highly-valued of trotters. The road horse, though having the same gait, falls short of being a "trotting horse," only in that he cannot make speed with the wheel-and-harness kings of the turf. If a trotter have great speed the lack of style in him is overlooked. If he is stylish and fast enough for fine driving he will bring a good price as a roadster, even though he do not possess great speed. A trotter which lacks both style and speed degenerates into a mere hack.

IX. Hunting Horses.

Another valuable class of horses, especially in the South, are what would be denominated in England, light hunting horses. The light hunting horse must be well-bred, able to gallop at speed, and to leap ordinary obstacles, as hedges, ditches and fences; in this country he should be taught to swim easily and take to the water promptly, especially when deer is the game hunted. Thoroughbreds, that are not fast enough for the turf, make capital hunting horses, for foxes, and, in open, smooth country, for deer and prairie wolves; but they are not capable of carrying heavy weights in a rough country, or over serious obstacles, and under such conditions necessarily soon come to grief. No matter what may be the blood of a horse, if he do not take kindly to the water and to leaping, he would be dangerous in the extreme to ride to hounds, or at least would soon fall behind the chase, which is but little less mortifying to the true huntsman than to be landed in a ditch. The hunter of to-day

is far better-bred and lighter than those which men now in middle age rode in youth, though a three-quarters-bred horse, of the Monmouth-Eclipse blood, upon which, as a boy we followed the chase in Illinois, up

A Light Hunting Horse.

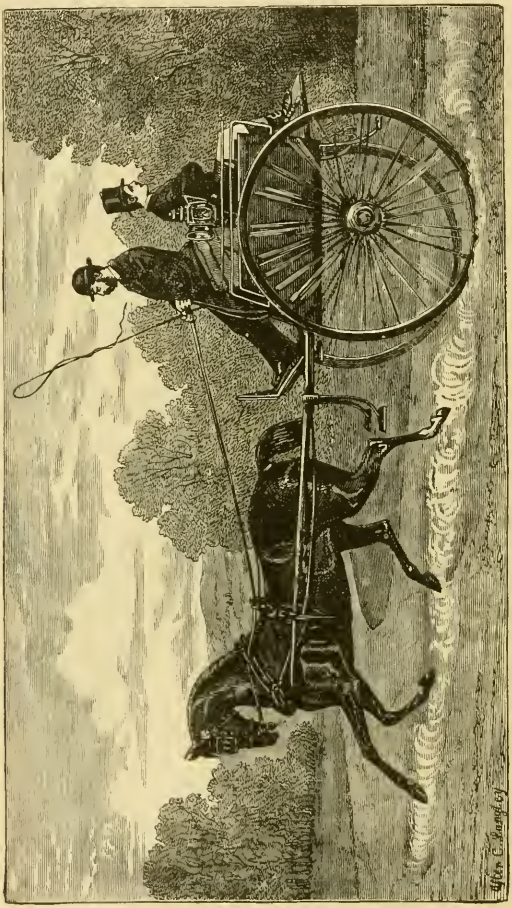
to thirty years ago, was well-enough bred for to-day. He was a large, slashing horse, that never refused a Virginia fence, ditch or water,—there were no hedges in the West in those days—and never brought the rider to grief, though sometimes disaster seemed near enough as we went

floundering in and out of deep, muddy streams. The horse, the deer-hound, the mastiff and the boy were all good friends, a veritable happy family who were in at the death of many a deer and prairie wolf, before fences obstructed the chase in Northern Illinois.

A Heavier Hunting Horse.

A Heavier Hunting Horse.—The next illustration shows a heavier hunting horse for the saddle, when speed and bottom are desired. He is a horse of good style and action, capable of long and high speed under

the weight of a man of 180 pounds—and heavier men should never hunt. Such a horse should be capable of great speed when called on,



A Fine Trotter in Light Harness.

able, and willing to take any leap a sensible man would put him at, and sure-footed to a high degree. To this end, every hunting horse should have large lungs and heart, the best possible form, hard, firm bones,

strong tendons, and great muscular power. He should be cleanly formed, oblique shouldered and fetlocked, with high withers. If, in addition, he have what is called a double loin, he will carry his rider safely and easily, and combine in his form all the requisites of a good saddle horse, that will leave any cold-blooded horse blown in a very short trial of bottom; for the horses we have been describing are not found outside the range of highly bred animals. Nevertheless, it must be remembered that the hunting horse is not to be put to the labor of draft; in fact, he should never be harnessed. He is a saddle horse, and the form required to move easily in harness, and especially under a load, would soon unfit him for the saddle, and for the hunting field.

X. Light Driving Horses.

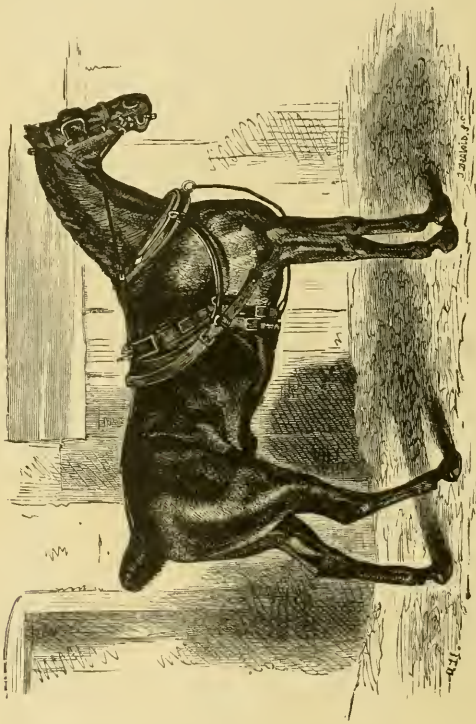
The light driving horse is not required to have high speed; eight to twelve miles an hour is sufficient; but he must be of unimpeachable style and action. Such horses are much sought, for driving on smooth roads, in parks and pleasure-grounds, where style and luxurious surroundings are the rule. They are also valuable for any service when only one person, or, at most, two light ones, are to be carried, since they will often go rapidly over roads with one person where heavier horses would labor.

Here, again, we present an English type which shows a horse, the perfection of style and action, in movement. Sometimes they are fast, but not when going in the form shown in the illustration. The head is out of position for fast work, but is right for style and dainty movement. It will be observed that there is no check-rein. The horse has been trained under a curb, and requires nearly as light a hand to manage as though under the saddle.

XI. Coach Horses.

The carriage horse bears to the coach horse the same relation that the light driving horse bears to the roadster. Horses, for the light or medium-weight carriage, should be handsome in appearance, and of better speed than those used for the coach or boxed-in vehicle. Any road-horse of 1050 to 1100 pounds will be suitable for the light or medium carriage. For the coach, a more stately animal is sought. He may have rather long limbs, if he is otherwise of suitable form and of good style; but he must not be deficient in muscular power, since a fair speed is required, and without muscle no horse can drag a coach over muddy, difficult roads. The illustration we give of an English coach horse shows a long-limbed, rangey horse, stylish and muscular. He should be from 16 to 17 hands high, with clean-cut head and neck, since only this class of horses can acquire the high stepping action, so much sought by

elderly ladies and gentlemen, who seek to compensate in this way for the speed they so liked in their younger days. How to breed such horses is partially stated in describing the Conestoga horse. Another way would be to breed staunch, muscular and handsome thoroughbreds upon mares of large size, round barreled, and of good form.

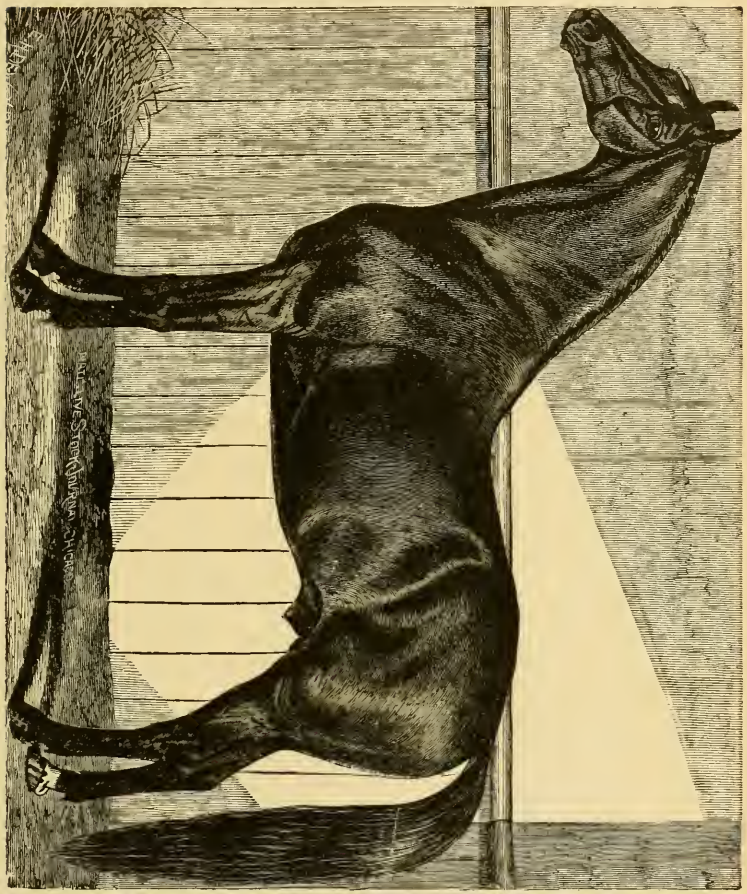


AN ENGLISH COACH HORSE. HEAVY DRAFT.

XII. The Cleveland Bay.

We come next to a class of horses always held in the highest esteem for their many valuable qualities. It is a horse that is now bred to a degree of perfection that leaves little to be desired in all that goes to constitute size, style and ability to perform any labor that may be required, except the heaviest drudgery. The Cleveland Bays are good carriage

horses, good and stout wagon or plow horses, and they match together about as easily as Devon cattle, combining, as they do, plenty of staunch



A CLEVELAND BAY.

thorough blood with excellent size and constitutional vigor. Unfortunately they are yet rare in the United States, but since their introduction into the West, they have been steadily growing into favor. They are remarkable for their pure bay color, dashed only at the fetlocks and in the

forehead with white. The illustration shows one of the most perfect of the class, a blood-bay with one white hind fetlock, and a star in the forehead. The old-fashioned Cleveland Bay of fifty years ago in England is, like the Conestoga of the United States, extinct, but a better horse in every way has been bred up from him.

The late Henry William Herbert describes them as he knew them in England, when a boy. "This great English family," says Mr. Herbert, "which may, perhaps, be regarded as the true type of the English horse of the Midland Counties, from the remotest times, is that of the far-famed Cleveland Bays. Cleveland, a district of the East-riding of Yorkshire, and the Vale of Pickering, in the same county, has been, from a very distant period, the principal breeding region for carriage horses, hunters, troop horses, and hackneys, of the highest grade; and it still preserves its character in that particular; although the character of the animals themselves, used for all these purposes, is now entirely altered; and although, in consequence of the alteration of the demand, the original breed is rapidly passing away, and a pure Cleveland Bay, of unmixed or unimproved blood, is now rarely to be met with, even in its own native district.

"The Cleveland Bay, in its natural and unmixed form, is a tall, powerfully-built, bony animal, averaging, I should say, fifteen hands three inches in height, rarely falling short of fifteen and a half, or exceeding sixteen and a half hands.

"The crest and withers are almost invariably good, the head bony, lean, and well set on. Ewe necks are, probably, rarer in this family than in any other, unless it be the dray-horse, in which it is never seen.

"The faults of shape, to which the Cleveland Bay is most liable, are narrowness of chest, undue length of body, and flatness of the cannon and shank bones. Their color is universally bay, rather on the yellow bay than on the blood bay color, with black manes, tails and legs.

"They are sound, hardy, active, powerful horses, with excellent capabilities for draught, and good endurance, so long as they are not pushed beyond their speed, which may be estimated at from six to eight miles an hour, on a trot, or from ten to twelve—the latter quite the maximum—on a gallop, under almost any weight.

"The larger and more showy of these animals, of the tallest and heaviest type, were the favorite coach horses of their day; the more spry and lightly-built, of equal height, were the hunters, in the days when the fox was hunted by his drag, unkenneled, and run half a dozen hours or more, before he was either earthed, or worn out and worried to death. Then the shorter, lower, and more closely ribbed-up were the

road hackneys; a style of horse unhappily now almost extinct, and having, unequally, substituted in its place, a wretched, weedy, half-bred or three-quarter-bred beast, fit neither to go the pace with a weight on its back, nor to last the time.

"From these Cleveland Bays, however, though in their pure state nearly extinct, a very superior animal has descended, which, after several steps and gradations, has settled down into a family, common throughout all Yorkshire, and more or less all the midland counties, as the farm-horse, and riding or driving horse of the farmers, having about two crosses, more or less, of blood on the original Cleveland stock.

"The first gradation, when pace became a desideratum with hounds, was the stinting of the best Cleveland Bay mares to good thoroughbred horses, with a view to the progeny turning out hunters, troop horses, or in the last resort, stage-coach horses, or, as they were termed, machiners. The most promising of these half-bred colts were kept as stallions; and mares, of the same type with their dams, stinted to them, produced the improved English carriage horse of fifty years ago.

"The next step was the putting of half-bred fillies, by thoroughbreds out of Cleveland Bay mares, a second time, to thoroughbred stallions; their progeny to become the hunters, while themselves and their brothers were lowered into the carriage horses; and the half-bred stallions, which had been the getters of carriage horses, were degraded into the sires of the new, improved cart-horse."

Thus it will be seen that we have good authority for our admiration of this splendid animal. Canada has of late years become celebrated for finely-bred and finely-matched carriage horses; which is due to the sagacity of some Canadian breeders, in selecting Cleveland Bay stallions for sires.

XIII. Ponies.

Ponies are much sought, of late years, for children's riding, and for pony carriages. Indian ponies, Canadian ponies, and Shetlands have all been called into requisition, while in the West and South, the smaller Mustangs of Texas are used. Unless taken young, the Mustangs are wild, intractable, and often vicious. The Indian pony is fast becoming extinct, and Canadian ponies are also growing scarce. These latter, many of them, are really handsome, small horses, of thirteen to fourteen hands high, hardy, docile and of the most steadfast nerve, courage and bottom. They are self-willed, but perfectly tractable if not abused. Shetland ponies are still smaller, and rougher; but they are ambitious little fellows, and scamper along easily at a good pace, with a twelve year old boy or girl on their backs. The illustration, shows a group of these hardy little animals. It is claimed that

no true Shetland can be more than eleven hands high, and some of those in the extreme northern isles of Tell and Unst do not exceed seven and

SHETLAND PONIES.

a half hands. The average is from nine to ten hands. Although the smallest of ponies, they are the most perfect in form, round and closely

ribbed-up, with lean bony heads, wide between the eyes, and otherwise well shaped, very muscular, with coarse bushy manes and tails. They are gentle and easily trained; and it is said that some of them are capable of carrying a light man forty miles between sunrise and sunset.

The Mustang.—The Mustangs are undersized and not handsome; descended from horses gone wild after escaping from the early Spanish adventurers, they have degenerated owing to the scanty fare and hard usage received at the hands of their Indian masters. They are of various colors, as are all the semi-wild horses of Texas and Mexico. The Indian ponies found in the West are undoubtedly of the same origin as the Canadian pony. They are pure, but modified, Norman, escaped from domestication and bred in a half wild state by the Indians of the Northwestern States and Territories. They are larger and heavier than the Indian horse or Mustang of the Southwestern plains and are in every way superior animals. Sometimes they are fourteen hands high, but the average is about thirteen hands. They are compact, closely ribbed, stout, muscular, courageous little fellows, docile and sagacious in the extreme, with wavy tails, and shaggy manes falling on both sides of the neck. If carefully bred in high northern latitudes, and well-trained, they would make admirable children's ponies and would readily sell for large prices to the wealthy.

XIV. The Vermont Draft Horse.

This is another breed of horses of most admirable qualities, specimens of which are now very rare, probably because their use in cities has been superseded by the introduction of the Percheron, Clydesdale and other heavier animals. The Vermont draft horses would weigh from 1,150 to 1,200 pounds; of fine breeding, clean-limbed, handsome, muscular, with fine crests, capable of drawing heavy loads at a good pace, they were in the days preceding the advent of the locomotive, the crack horses of the stage companies of the Northern New England States. As cavalry horses, they were said to have no superior, since they moved with speed, alertness, and with great force and power by reason of their weight. It is to be hoped that we may find, in the Cleveland Bay and his crosses, as good an animal of all work, both for saddle and harness.

XV. The Narragansett Pacer.

Here is another of the extinct races of American horses, one that is said to have originated in Rhode Island, from an Andalusian stallion brought from Spain at an early day. They were largely raised, during the last century and the first part of the present century, for exportation to the West India Islands for the use of the families of the planters. Their only gait was a pace of the most perfect and easy-going description. They are reputed to have been so easy-going that ladies could ride

them forty miles a day for many days in succession without experiencing excessive fatigue. That they were horses of great bottom, and sometimes of extraordinary speed, is undoubtedly true. The Colonial divine, Dr. McSparren, in his "America Dissected," speaking of the horses of Virginia, says: "There were plenty of a small sort of horses — the best in the world, like the little Scotch Galloways; and 't is no extraordinary journey to ride from sixty to seventy miles in a day. I have often, but on larger pacing horses, rode fifty, nay, sixty, miles a day, even here in New England, where the roads are rough, stony and uneven." Again, speaking of the Narragansett pacer particularly, as an animal for export, he says: "They are remarkable for swift pacing; and I have seen some of them pace a mile in a little more than two minutes, and a good deal less than three." The good doctor probably did not hold a timing-watch on them. The story, however, is fully as credible as that other story of Flying Childers having run a mile in a minute.

CHAPTER VII.

THOROUGHBRED HORSES.

I. ENGLISH THOROUGHBREDS.——II. HERBERT'S HISTORY OF THE ENGLISH HORSE.——III. THE FIRST LONDON RACE COURSE.——IV. HORSES TAKEN TO ENGLAND BY CRUSADERS.——V. BONE AND BI'LK IMPARTED TO THE ENGLISH HORSE.——VI. THE HORSE IN THE TIMES OF HENRY VIII AND JAMES I.——VII. AMERICAN THOROUGHBREDS.——VIII. THE ARABIAN.

I. English Thoroughbreds.

The English thoroughbreds are horses of mixed lineage. They are not a pure race, bred for hundreds of years without admixture of foreign blood; but they rather owe their great excellence to the crossing of Arabian, Barb, and other Oriental blood, upon the best racing stock of the last and the preceding century. The English have been famous, during the last thousand years, for their horses, especially for horses of speed and endurance. They have always had a passionate fondness for the chase and for racing; and their kings and nobles have done much to keep alive this feeling, by securing, from time to time, the best foreign blood that could be secured to impart fresh stamina and vigor to their stock of horses. Many persons are prejudiced against thoroughbred horses, because they have been used for gambling purposes on the turf, but this fact should not be allowed to create hostility against valuable animals. As well might wheat and corn be placed under a ban because these indispensable cereals are used for purposes of gambling speculation. It is this passion for trying the speed of horses, which has prevailed during the last ten centuries, that has led to the selection of the best breeds and given an impetus during the past 100 years to really scientific breeding. And it is to these latter causes that we owe all that is of value in any of the improved breeds of horses existing to-day, not even excepting our draft horses. Let us look at the history of the blooded horse of England, and view its gradual rise and progress, even from beyond the Christian era.

II. Herbert's History of the English Horse.

Henry William Herbert, in his admirable and voluminous work on the Horse of America, now unfortunately out of print, has traced the English horse so carefully, and at the same time so concisely, that one cannot do better than extract therefrom matter that otherwise the mass of the readers of to-day could not come at. He says, upon the authority of Youatt: "That horses were introduced into Britain long before the Christian era, we have abundant evidence, and that the inhabitants had

acquired great experience in their use is equally certain. In the ancient British language *Rhediad* is the word for a race—*rheder*, to run—and *rhedeefa*, a race. All these spring from the Gaulish *rheda*, a chariot. Here, then, is a direct evidence that horses were introduced from Gaul, and that chariot-races were established at a very early period.'

"This evidence" says Mr. Herbert "is not to my mind direct or conclusive, as to the fact of the introduction of the horse from Gaul; although it is so, as to the antiquity of chariot-racing in both countries, and to the non-Roman descent or introduction of the British or Gaulish animal. As the blood, the religion and the language of the Britons were cognate, if not identical, with those of some, at least, of the Gallic tribes, it is no more certain that the Gallic *Rheda* is the theme of the British *rheder*, than that it is derived therefrom. It does, however, in a great degree prove that the Gallic and British horses were identical, and descended not from any breed transmitted through Greece and Italy, but from one brought inland to the northward of the Alps; perhaps by those Gauls, who ravaged Upper Greece and Northern Italy, almost before the existence of authentic history; perhaps by their original ancestors; at all events, of antique Thracian or Thessalic descent, and, therefore, of remote but direct oriental race, in all probability again improved by a later desert cross, derived from the Numidian cavalry of the Carthaginian Barcas, long previous to the Cæsarian campaigns in Gaul or the invasions of the sacred island of the Druids. This, however, is of small immediate moment, and is more curious and interesting to the scholar and the antiquary, than to the horseman or horsebreeder.

"From the different kinds of vehicles, noticed by the Latin writers, it would appear that the ancient Britons had horses trained to different purposes, as well domestic as warlike.

"It is well observed by Youatt, in his larger work on the horse, that from the cumbrous structure of the car, and the fury with which it was driven, and from the badness or non-existence of roads, they must have been both active and powerful in an extraordinary degree. 'Cæsar,' he adds, though without stating his authority, 'thought them so valuable, that he carried many of them to Rome; and the British horses were, for a considerable period afterwards, in great request in various parts of the Roman empire.'

"'During the occupation of England by the Romans, the British horse was crossed to a considerable extent by the Roman horse,' continues the author in the volume first quoted; for which I would myself, for reasons above stated, prefer to substitue *by the foreign horses of the Roman mercenary or allied cavalry*, 'and yet, strange to say, no opinion is given by any historian, Roman or British, as to the effect of this. After the

evacuation of England by the Romans, and its conquest by the Saxons, considerable attention was paid to the English breed of horses, and we know that after the reign of Alfred, *running horses* were imported from Germany;' this being the first historical intimation we have of running horses in England. It is scarcely to be doubted that this importation produced a marked effect on the character of the native breed, but here, as before, no historian has thought it worth his while to record the fact of either improvement or deterioration.

"'English horses, after this, appear to have been highly prized on the continent, so that the German horses which were presented by Hugh Capet to Athelstan had been turned to good account. The English themselves were, however, anxious to preserve the monopoly of the breed, for in 930, A. D., a law prohibited the exportation of horses. In Athelstan's reign many Spanish horses were imported, which shows the desire of the English, even at that early period, to improve the breed. It is no wonder that their descendants should have produced the finest horses in the world. Shortly before the Norman conquest a horse was valued at thirty shillings, a mare or colt at twenty shillings, an ox at thirty pence, a cow at twenty-four pence—these prices in case of their being destroyed or negligently lost—and a *man* at a pound.' Money, it should be noted, then being equivalent to at least fifteen times its present value. William the Conqueror took great pains to improve the English breed, introducing many fine animals from Normandy, Flanders and Spain. This monarch owed his success at Hastings chiefly to his cavalry; his own horse was a Spanish one. In this reign we have the first notice of horses being employed in agriculture. They had been used for the saddle for many centuries, Bede informing us that the English began to use horses as early as 631 A. D., and that people of rank distinguished themselves by appearing frequently on horseback. During the Conqueror's reign the then Earl of Shrewsbury, Roger de Belesme, brought a number of Spanish horses to his estate of Powisland. The breed issuing from these is highly eulogized by Giraldus Cambrensis and Dayton. In the reign of Henry I. we have an account of the first Arab horse imported into the country. It was presented by Alexander I., King of Scotland, to the church of St. Andrew's, with many valuable accoutrements and a considerable estate. History, however, is silent as to the purposes to which this animal was devoted, or as to what ultimately became of him.

"It has been well pointed out, in this connection, that the ancient historians, being exclusively monks and churchmen, naturally paid little attention to the breeding of horses, which were held to belong to war rather than to agriculture, and were forbidden to their order; and farther, it may be observed that, until, comparatively speaking, very recent times,

no heed has been given to the statistics of agriculture or animal improvement, and little mention made of such matters, beyond a casual and passing notice, even by the best historians.

III. The First London Race-Course.

"'The English,' proceeds the work from which I quote, 'had now,' —that is to say in the reign of Henry I.—'become sensible of the value and breed of their horses; and in the twelfth century a regular race-course had been established in London, this being no other than Smithfield, which was at once horse-market and race-course. Fitz Stephen, who lived at that period, gives the following account of the contests between the palfreys of the day. 'When a race is to be run by horses, which in their kind are strong and fleet, a shout is raised, and common horses are ordered to withdraw from out the way. Two jockeys then, or sometimes three, as the match may be made, prepare themselves for the contest, such as are used to ride, and know how to manage their horses with judgment, the grand point being to prevent a competitor from getting before them. The horses on their part are not without emulation. They tremble, and are impatient and continually in motion. At last the signal once given, they hurry along with unremitting velocity; the jockeys inspired with the thoughts of applause and the hopes of victory, clapping spurs to their willing steeds, brandishing their whips and cheering them with their cries.'

IV. Horses taken to England by Crusaders.

"It is stated by Mr. Youatt, although, singularly enough, he maintains that the crusaders did not introduce eastern horses, that Richard I, did import two from Cyprus, which he observes were of eastern origin. The statement is made on the faith of an old metrical Romance, which is that entitled by the name of the monarch whose feats it celebrated, usually supposed to be of the time of Edward I., and contained in Ellis's Metrical Romances. The lines are curious, as they indicate a full acquaintance with various animals, natives of the East, and more particularly with the especial qualities of the oriental horse, his speed and surefootedness.

"These horses were named Favell and Lyard—

> 'In the world was not their peer,
> Dromedary, not destrere,
> Steed 'rabyte, ne camayl,
> That ran so swift sans fail,
> For a thousand pounds of gold,
> Should not that one be sold.'

Destrere, is the old spelling of the word *Destrier*, in Norman French, derived from the barbarous, Middle Age Latin, *Dextrarius* signifying a

war-horse. Edward I. also is known to have introduced horses from the East; and that accurate and inquiring antiquary, Sir Walter Scott, describes his spirit, or the demon of the haunted camp under his form, in the nocturnal tourney with Alexander of Scotland, as being recognized by the horse he bestrode.

'Alike his Syrian courser's frame,
The rider's length of limb the same.'

V. Bone and Bulk Imparted to the English Horse.

"Spanish horses, had come to be renowned, as chargers, so early as the Norman conquest, but it is more than questionable whether their superiority was as yet known to arise from their being traceable, in nearly two thirds, to the blood of the Desert. At this time, it would seem to have been considered desirable to stengthen the English horse, and gain bone and bulk, rather than blood—not, I imagine, as Mr. Youatt suggests in the following sentence, for agricultural, but rather for military purposes; in order to endure the ponderous burden of the mail-clad men-at-arms.

"King John, he says, 'paid great attention to the improvement of horses for agricultural purposes, and to him we are indebted for the origin of our draught-horses. He chiefly imported Flemish horses'—one hundred chosen stallions on a single occasion; the Flanders horse being —as it was even in the time of Marlborough and Prince Eugene—the most approved cavalry trooper—' and such was his anxiety to possess the finest stock from these, that he would accept strong horses as rent for crown-lands, and as fines for the renewal of leases. His personal stud was both numerous and excellent.' One hundred years afterward, Edward II. purchased thirty war-horses and twelve heavy draught-horses.

"Edward the III. devoted one thousand marks to the purchase of fifty Spanish horses; and of such importance did he conceive this addition to the English, or rather mingled blood, then existing, that formal application was made to the kings of France and Spain to grant safe-conduct to the troop. When they had safely arrived at the royal stud, it was computed that they had cost the monarch no less than thirteen pounds six shillings and eight pence per horse, equal in value to one hundred and sixty pounds of our money. This monarch had many *running horses*. The precise meaning of the term is not, however, clear. It might be light and speedy horses in opposition to the war-horses, or those that were literally used for the purposes of racing."

VI. The Horse in the Times of Henry VIII. and James I.

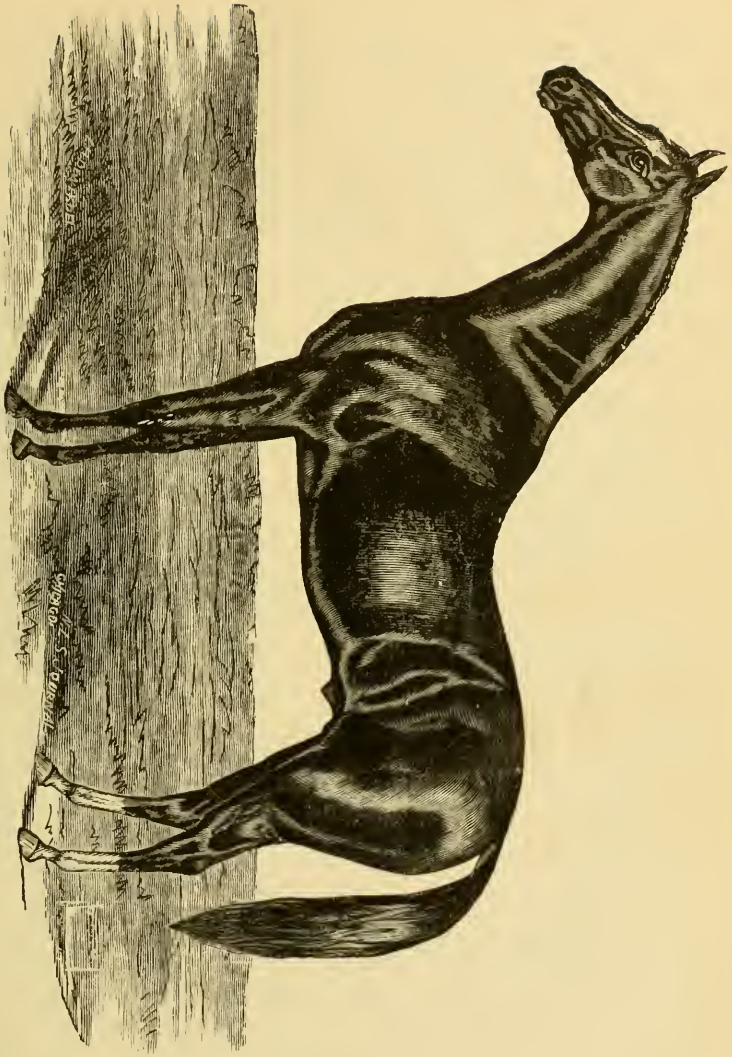
Our authority follows the history of the horse in England up to the reign of Henry VIII., who compelled the destruction of under-sized

horses, and rendered compulsory the maintenance of so great a number of full-sized mares and stallions, in every deer park, and in every rural parish of the realm, that the reign of this monarch was marked by a decided increase in the breeding of powerful, well-formed animals. It appears that the King even rode a race himself, for it is stated, by Miss Strickland, that the King rode a-Maying, with Katherine and the royal bride, Mary, widow of Louis XII., of France, and the bride of Charles Brandon. The amusements of the day, says Miss Strickland, were brought to a close by the King and his brother-in-law, the Duke of Suffolk, riding races on great coursers, which were like the Flemish breed of dray horses. During the reign of Henry VIII., an annual race was run at Chester, the prize being a wooden ball, handsomely embellished, for which, in 1540, a silver bell, called St. George's bell, was substituted. Hence the phrase, "Bear the bell," in allusion to one who has come off victorious in a contest.

In the reign of James I. races were merely matches against time, trials of speed and bottom for long and "cruel distances." From the time of James I. the history of the English race-horse, and of English racing, may be said fairly to begin, though no existing pedigrees are traced back to that time. But, though pedigrees be not directly traced to great antiquity, enough has been given of the history of English horses to let the reader know how long was the time, and how careful the breeding, required to produce, in the thoroughbred of to-day, the most superb race of horses the world has ever known; for wind, speed and bottom, he is without a rival in ancient or modern times.

The horse has of course always figured prominently in fiction and romance; but in this connection it will suffice to state the fact that in the Homeric poems of the Trojan war, there is no mention of the trumpet or of cavalry. In Virgil, mounted men, saddles, spurs, and clarions are mentioned. In the romance of "Sir Bevis, of Southampton," he speaks of races of three miles, for "forty pounds of ready golde." Homer knew nothing of horsemen and trumpets in war, while Virgil was familiar with them. The author of "Sir Bevis," in his day and generation probably saw races of long distances, and long-distance races generally precede short ones.

The excellence of the English race horse of the last 100 years is probably more due to the Barb than to any other one strain. It was in 1121 that the first Arabian was imported into England, but the Arabian of that day was not what he was in the centuries 1400, 1500 and 1600, during the time immediately succeeding the overthrow of Charles I. Of English racing horses, Eclipse was the most wonderful of all whose performances have come down to us well authenticated.



AMERICAN THOROUGHBRED OF TO-DAY.

VII. American Thoroughbreds.

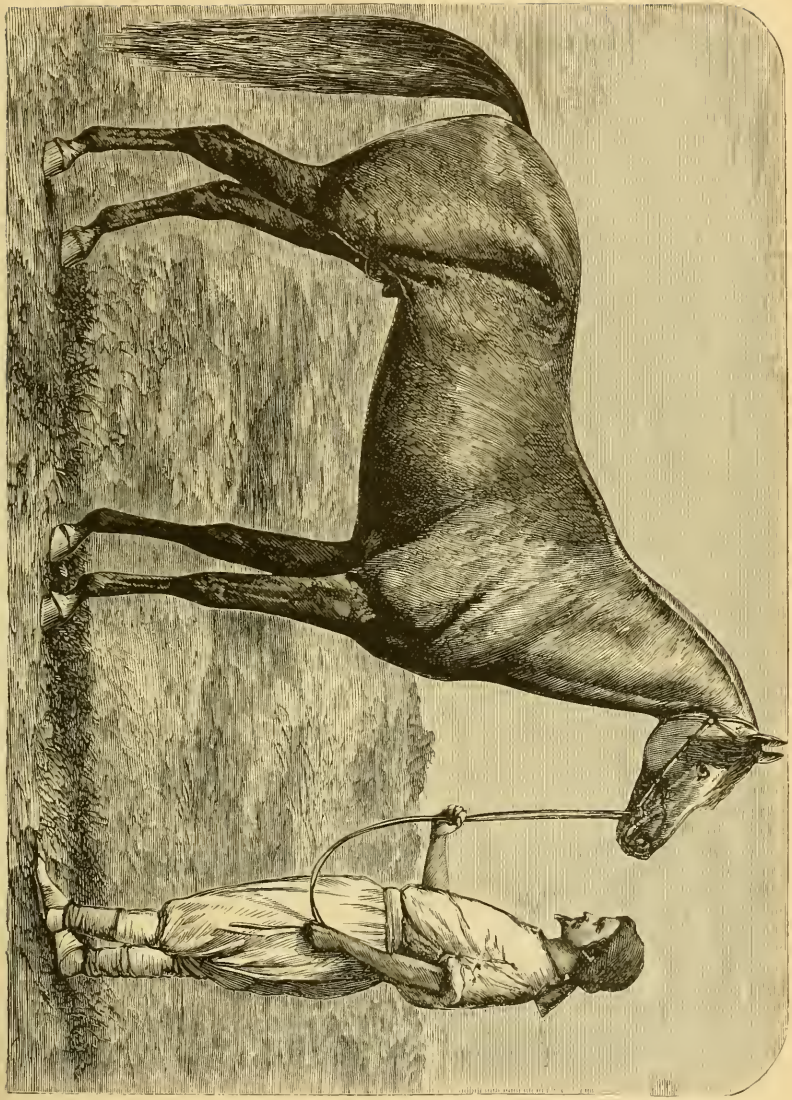
The thoroughbred horse of America is of course the descendant of English ancestors. It is probably true that the American thoroughbred is a superior animal to the English thoroughbred; and this opinion is certainly fortified by the triumphs of American horses in England and France, in their greatest races, in the year 1881. A horse transported from one country to another, entirely different in climate, might be pardoned for not performing as well there as he would do at home. Yet, our horses have won laurels in England and France from the very best thoroughbreds there, and in their most exacting races.

In the South, there has always been a passion for the sports of the field, and much attention has been devoted to the breeding of horses of speed and bottom. Interest in fine horses is growing in the North from year to year, but while we have some high-caste breeding studs in the North, the South, and especially Kentucky and Tennessee, still holds the lead. It will not be necessary here to go into a detailed history or description of the American thoroughbred. Importations made before the revolutionary war, and continued from time to time have given us a horse that has no superior on the earth; one that has at last snatched victory from the best of English horses on their own turf. In France, American horses have held their own against the best of English and French thoroughbreds.

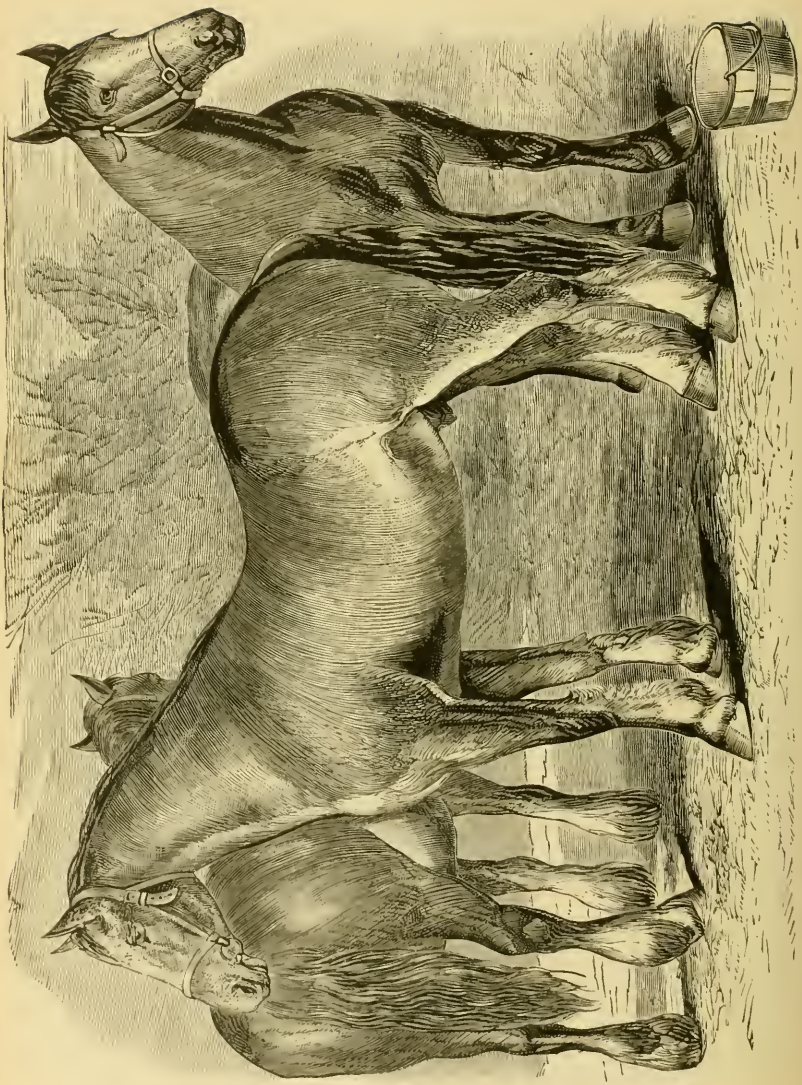
VIII. The Arabian.

The Arabians profess to trace the ancestry of their horses back to the time of Solomon, yet in the light of authentic history, their horses before the thirteenth century were not of a character worthy of special notice. The horse of the desert receives the personal care and affection of his master. To the Arab the horse is not only a companion in solitude, but is also his only means of locomotion in arduous and perilous journeys. It is not strange, therefore, that these nomads of the desert should bestow much care upon the breeding and rearing of their horses; and during the past seven centuries, such care has been bestowed. The Arabs undoubtedly did understand the true principle of breeding, care, feeding, selection and training, at a period when Arabia was the seat of learning, and all Europe was enveloped in the gloom of the dark ages, or was just beginning feebly to see the dawn of the revival of letters.

Arabian travelers of the last century do not agree as to the number of distinct breeds of horses in that country. A Mohammedan writer who seems to have had candor, and a good opportunity for gathering facts divides them into six tribes, as follows:



AN ARABIAN OF THE DESERT.



YOUNG CLYDESDALES.—(See page 102.)

"The Dgelfe, found chiefly in Arabia Felix, seldom seen at Damascus, but common in the neighborhood of Anaze. Horses of this breed are of lofty stature, have narrow chests, but are deep in the girth, and their ears are long. They are remarkable for spirit and fleetness, but are exceedingly tractable, and their ability to endure hunger and thirst is a remarkable feature.

"The Secaloni, a breed from the eastern part of the desert, somewhat inferior to the Dgelfe, though resembling him in most points.

"The Mefki, a handsome horse, but not so fleet as either the Dgelfe or the Secaloni. In figure, he bears a resemblance to the Spanish or Andalusian stock.

"A fourth breed is called the Sabi, similar to the Mefki, but seems to possess no specially useful or striking qualities.

"The Fridi. This breed is very common; but they are often vicious and untrustworthy, and lack some of the excellent qualities possessed by the best of the others.

"The Nejdi, found chiefly in the region of Bussorah. These are said to be at least the equals of the Dgelfe and the Secaloni. Some judges assert that there is no horse to be compared with them, and they stand very high in the market."

The Dgelfe and Nejdi are reported to be the most valuable. They are known to be the favorites of the horse-fanciers of India, many fine animals of these stocks having been carried thither by the sportsmen of that country.

Other writers make mention of but three distinct breeds, to which they attribute names different from those above given; and it is difficult to reconcile the statements of the two, and to determine whether they have really agreed in any way in pointing out the same animal, though by diverse names, as possessing the striking excellences which have made a certain breed famous and well known to us. Writers of the latter class speak of an inferior race, little esteemed, at home or abroad, which they call the Attechi. These are sometimes found in a wild state. Then come the Kadischi, a sort of half-breed stock, possessing some points of resemblance to the true blood, and being sometimes imposed upon dealers for the genuine. Finally, they describe a superb race, the pure descendants of some extraordinary ancestors, and these they call the Kochlani or Kailhan. The best of them are found among the Shammar and Aneyza tribes. The Arabs themselves pretend to trace the Kochlani back to the days and the stables of Solomon. While this cannot be credited, it is known that some of them have written pedigrees for at least four hundred years, with extreme care, and always on the side of the mare. They are

finely-formed, enduring, fleet, rather small-sized horses of great vivacity and intelligence, but for speed, bottom and physical development decidedly inferior to our thoroughbreds. Yet, though not as swift as the English or American thoroughbred, the Arabian is one of the best of horses. And while we could hardly gain any advantage from a fresh infusion of this blood, the Arabian is king on his native deserts, and no other horse could there fill his place. He is peculiarly adapted to the wants of the people and to the topography of that barren country. So good a horse is he to-day that English residents in India pay from $700 to $1,000 for the best that are offered for sale; and it is well known that the best horses of the desert are never sold at any price. The illustration, page 129, shows the best form of the Arabian, as they are found in their native deserts.

As showing the wonderful variations in breeds, we present an illustration on page 164, as an object lesson of the immense Derbyshire cart horse of England, now comparatively rare. In the United States they are not considered valuable, having been superseded by the more modern and valuable Clydesdales and Norman-Percherons. A comparison with the Arabian will fully convey our meaning as between the delicately bred and nervous Arabian and the stolid and elephantine cart horse.

CHAPTER VIII.

ABOUT TROTTING HORSES.

I. THE BREEDING OF TROTTERS.——II. PROGENITORS OF FAST TROTTERS—MESSENGER. ——III. IMPORTED BELLFOUNDER.——IV. THE MODERN TROTTER——V. WHAT GOLDSMITH MAID WAS LIKE.—— VI. THE MOVEMENT IN TROTTING.——VII. DISUSE OF THE TROTTING FACULTY.—— VIII. A RECORD OF SIXTY YEARS.—— IX. STRAINS OF TROTTING BLOOD.

I. The Breeding of Trotters.

The production of trotting horses, like that of racers, has come to be a distinct branch of breeding, and is pursued as a specialty, with a view to developing, in the highest possible form, the best trotting action in the horse. Hence, any person undertaking this branch of the breeder's profession needs to understand the peculiar form to be attained, and also to know the families from which the best trotters have been bred.

The Morgans.—Twenty years ago the trotting form was thought by many to be most strongly developed in the Morgans; at least it was hoped that this breed might be found to possess the qualifications necessary to develop the highest degree of trotting speed. The Morgans, however, disappointed the expectations placed upon them. The records of the turf have proved that fast trotters owe their speed to thorough breeding; and that their speed is directly in proportion to the degree of blood of thoroughbreds of trotting peculiarities that is in their veins.

Ethan Allen.—Ethan Allen, one of the most celebrated of the Morgans, was a good trotter for his day, and yet he was never able to beat Flora Temple. At three years old he trotted a mile, three heats, in 2 : 42 ; 2 : 39 and 2 :36 minutes, which was the fastest time then recorded for that age. The false estimate placed upon Morgan horses up to twenty years ago, not only kept back the development of really excellent trotters, but was a positive and incalculable damage to the horses of the country generally, in that it caused the size of the farm animals to be reduced. For the farmers especially went zealously into the rage for possessing Morgan horses.

Development of the Trotting Horse.—The trotting horse of America has been entirely developed within the last forty years. He is not an animal of a separate and distinct breed; for first-rate trotters have come of Canadian or Norman-French blood, from the horses of the middle States of mixed blood, from the Morgans and other New England breeds, and from Western horses of mixed blood.

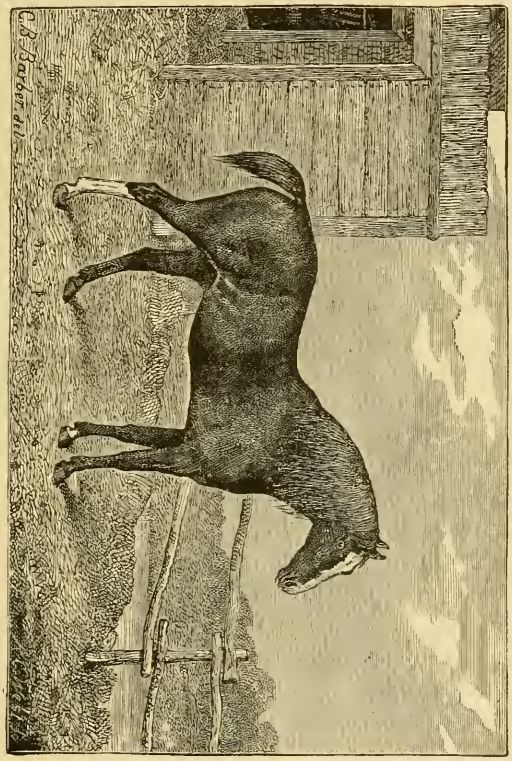
II. Progenitors of Fast Trotters.

Notable among the horses that have made wonderful records in trotting of late years are those descended from, and partaking largely of the blood of, Messenger, Bellfounder and of Hambletonian. Hambletonian, after a career of varied success as a racer, at length became distinguished as a getter of trotting horses of elegance, finish, speed and endurance, either under the saddle or in harness. It is not our purpose to go minutely into the record of noted performances on the American trotting turf. Nowhere else in the world is the fondness for exhibitions of speed in trotting, so nearly universal among the people, as it has become here; and in no other country are such exhibitions so patronized by every class. Even in Russia, the home of the famous Orloff breed, this sport is by no means a national one. Where the general reader is usually so well informed of current events, the familiar details of exploits upon the turf are deemed to contain far less interest than will be found in a brief account of some of the most celebrated sires, whose descendants have proved constant in their performances.

Messenger.—The original source of our best blood, Imported Messenger, not only gained fame for himself, but bequeathed his excellences to a long line of descendants, who have been famous in the annals of the turf. His own ancestry possessed character for great and peculiar merit. Foaled in 1780, his first sire was Mambrino; second sire, Engineer; third sire, Sampson; fourth sire, Blaze; fifth sire, Flying Childers; sixth sire, The Darley Arabian. On the female side, his dam was by Turf; second dam, the sister of Figurante, was by Regulas; third dam by Bolton Starling; fourth dam, Snaps by Fox; fifth dam, Gipsey by Bay Bolton, and so on through Newcastle Turk, Brierly Turk, Taffolet Barb, to the ninth dam by Place's White Turk, out of a natural Barb mare. Messenger was threfore in-bred to a considerable degree, and combined in his veins the purest and richest blood of early English race horses.

Potency of Arabian Blood.—Godolphin Arabian appears three times in the pedigree of Messenger. Flying Childers was the phenomenon of the English turf in his day, and the accounts of his performances appear almost fabulous. Of one of the progenitors of Messenger, Sampson, it is said that while the thoroughbred of his day was scarcely more than fourteen and a half hands high, rarely reaching fifteen, Sampson was fifteen hands two inches, and was reported to be the largest-boned blood horse then ever bred. Horses of the Sampson blood, as we knew it nearly forty years ago, were wonderfully compact animals of great bone, muscle and sinew. Sampson, Engineer and Mambrino were all rough and coarse, and the last two were considered the strongest and heaviest-boned horses

of the English turf. It was a most lucky circumstance for American studs that a scion of these coarse horses was imported, to stamp his impress upon the thoroughbred of this country. We have found that kind of coarseness to be the embodiment of strength, bone, muscle, and consequently of most enduring speed and bottom.



"SHALES," AN ENGLISH TROTTER.

III. Imported Bellfounder.

This wonderful animal was known in his day as the Norfolk trotter, and was, like Flying Childers, a phenomenon of the turf. He was fifteen hands high, a bright bay in color, with black legs. Being seven years old at the date of his importation, in 1822, he must have

been foaled in 1815. At five years old he trotted two miles in six minutes, and the next year, trotted nine miles in twenty-nine minutes and thirty-eight seconds. Velocity, his dam, by Haphazard, trotted, in 1806, sixteen miles in an hour, and in 1808 trotted twenty-eight miles in an hour and forty-seven minutes; wonderful work it was for that day, and would be so considered, if performed by a horse of the present time.

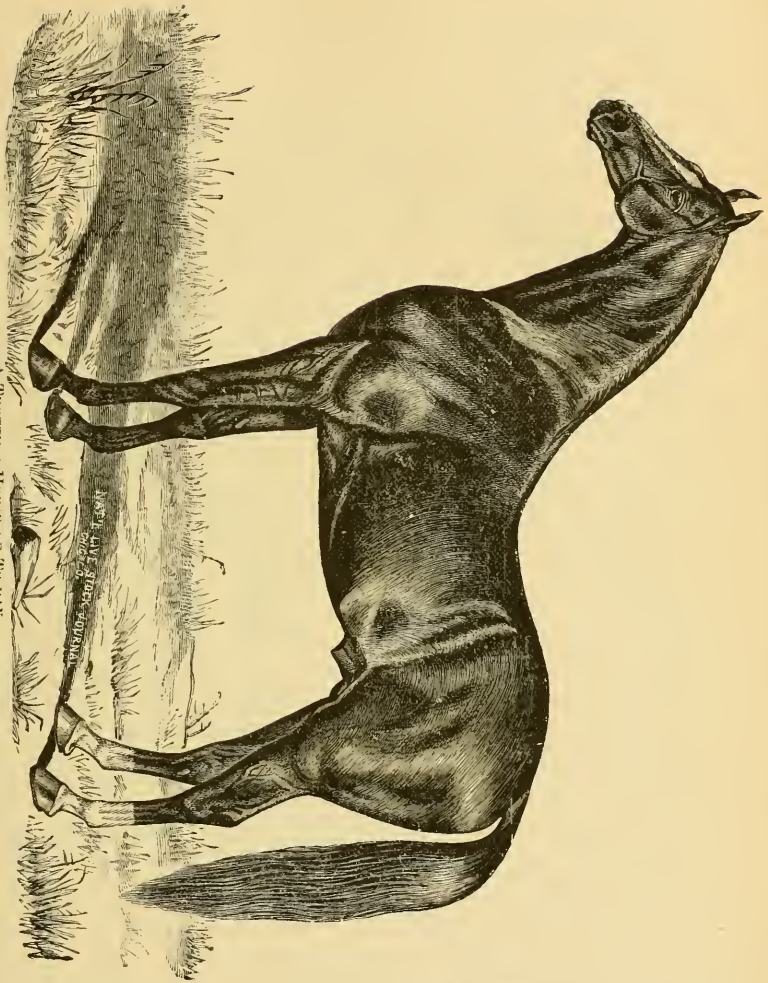
Bellfounder's Ancestry.—Bellfounder was not thoroughbred. He was sired by Fireaway out of a Shields mare. The Shields horse, otherwise called "Shales," in England nearly one hundred years ago were hackneys, or, as we would now call them, road and trotting horses. Had the English people cultivated driving, as they did riding, America might not stand unrivalled, as she does to-day, in the pre-eminence of her road and trotting horses.

IV. The Modern Trotter.

Our account of modern trotters would be incomplete if we should wholly omit to mention that wonderful descendant of Hambletonian, Lady Suffolk. Nor must the Morgans be forgotten. The Canadian trotters also claim remembrance; notable among which were those wonderful little pony-horses, many of them not fourteen hands high, known as the St. Laurences, from the name of their sire. The best of them were good for a three-minute gait on the road, before a buggy; for energy, docility, speed and tireless endurance, while drawing the load of a horse, they have seldom been equaled among animals of their size. But it is our purpose more especially to notice the famous trotters of the last twenty years.

Goldsmith Maid and Abdallah.—Among the galaxy of wonderful performers, none surpass Goldsmith Maid. This remarkable mare was foaled in 1857. Her sire was Edsall's Hambletonian, and her dam a mare by old Abdallah. Abdallah was a Hambletonian. In 1862 he became the property of R. A. Alexander, the celebrated Kentucky breeder of thoroughbreds, and was thereafter known as Alexander's Abdallah. Early in 1865, this Abdallah, together with several other valuable horses, among them Bay Chief, a son of Mambrino Chief, was seized by Guerillas. Shortly after, in an attack upon the guerillas by Federal soldiers, Abdallah fell into the hands of one of the attacking party, who refused to give him up. This magnificent stallion, unshod and wholly out of condition for hard service, was nevertheless ridden day after day, over the roughest and hilliest road, until at last, completely exhausted, he was turned loose on the wayside, and died of pneumonia.

Abdallah as a Sire.—To show what might have come of this horse, had he lived, it is only necessary to mention some of his offspring and to note



A TROTTING HORSE OF TO-DAY.

what they have done. First is Goldsmith Maid with a record of 2:14; and a further record of 232 heats with 2:30 as the slowest. We also have Major Edsall, who made his mile in 2:29; and Wood's Hambletonian,

with sons making records in from 2 : 23 to 2 : 27¾. Pacing Abdallah, the getter of excellent roadsters, was another of his sons, as was Belmont, the sire of horses going the mile in 2 : 23 ½ to 2 : 30. Again, there is Thorndale, a compact and muscular stallion, greatly celebrated, not only for his own great speed, but for the excellent trotting qualities of his offspring. In 1876, after serving eight years in the stud, he made five mile heats in 2 : 22¾; 2 : 22¼; 2 : 32½; 2 : 20; 2 : 25. Another remarkable son of Alexander's Abdallah, is Almont. His offspring are yet young to the track, but Piedmont, at four years old, trotted in 2 : 30½.

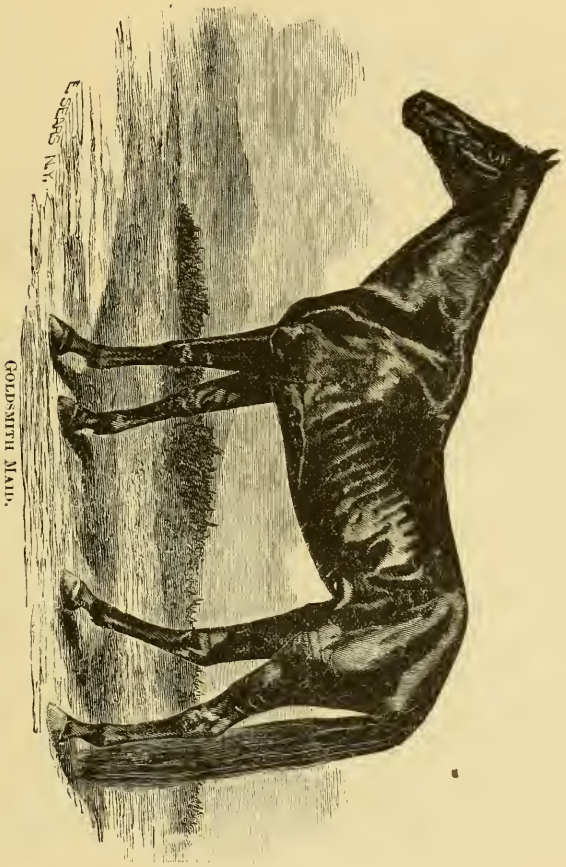
V. What Goldsmith Maid Was Like.

The likeness of Goldsmith Maid shows her appearance, when in trotting condition, and will be studied with interest as an accurate view of the proportions of this most famous and one of the best bred of the Queens of the trotting course. She was fifteen hands and one inch in height, and seems rather delicately made in a superficial examination of her form. Yet the quality of her make-up is in every respect superb.

An accurate and capable writer says of her: "Her head and neck are very clean and blood-like; her shoulder sloping and well placed; middle piece tolerably deep at the girth, but so light at the waist as to give her a tucked-up appearance, and one would say a lack of constitution, but for the abundant evidence to the contrary; loin and coupling good; quarters of the greyhound order—broad and sinewy; her limbs are clean, fine-boned and wiry; feet rather small, but of good quality. She is high mettled and takes an abundance of work without flinching. In her highest trotting form, drawn to an edge, she is almost deer-like in appearance, and when scoring for a start and alive to the emergencies of the race, with her great flashing eye and dilated nostril, she is a perfect picture of animation and living beauty. Her gait is long, bold and sweeping, and she is, in the hands of a driver acquainted with her peculiarities, a perfect piece of machinery. She seldom makes an out-and-out break, but frequently makes a skip, and has been accused of losing nothing in either case. Aside from the distinction of having trotted the fastest mile on record, she also enjoys the honor of making the fastest three consecutive heats ever won in a race, which renders any comments upon her staying qualities unnecessary."

The time of Goldsmith Maid has been beaten several times since 1877, but this detracts nothing from her wonderful performance. She continued on the turf until past twenty years old, and after completing that age she closed her public career with the year 1877 by trotting, during that year, forty-one heats in 2 : 30 or better, and making a time record of

2 : 14½. Her record stands at the close of her career at 2 : 14, with 332 heats in 2 : 30 or better. Her record and her career are the marvel of the age.



GOLDSMITH MAID.

VI. The Movement in Trotting.

A trotter, especially if he go fast, must go level and square, both before and behind, and with as low action as may be compatible with the necessary stride. It is this ability to go close to the ground, or in what

has been called by some the sling-trot, and by others the slouching trot, of the thoroughbred, that enables the best trotters to make their great speed; the sling-trot is simply the gait in which the animal reaches far forward without raising the feet unnecessarily high, thus economizing

Movement in Trotting.

time and muscle. This movement, at an easy gait, of, say twelve miles an hour, is well displayed in the cut illustrating the trotting movement. It is not an artificial gait, as has been stated by some good English horsemen. Every one who has reared a well-bred colt has seen it, when following the dam, strike naturally into this gait, with head up and tail

straight out. The trot is a natural gait of any horse, and is always used when going at easy speed on a smooth surface; but the best trotting action is the result of breeding and training.

VII. Disuse of the Trotting Faculty.

That the English blood-horse has lost the trotting faculty to a great extent, is not because it was never in the blood, but because it was never allowed to be exercised in the training. And, as few horses could ever gallop fast or far, without special training, so, no horse can trot to the best advantage unless the gait has been developed by long practice; and it is a peculiarity of this gait that the trotting horse, unlike the runner, seldom arrives at his best, until he is over eight years old. The same rule will apply to fast walking horses. They must be specially trained to walk fast, and there is no better preparation for the trotting horse than this preliminary training in walking.

VIII. A Record of Sixty Years.

This chapter could not be more appropriately brought to a close, than by a brief record of events showing the development of trotting horses, and the growth of speed. For the facts we are indebted to Porter's *Spirit of the Times*. They have been selected with special reference to their interest to the readers of this work:

In 1824, A. M. Giles trotted his horse 28 miles in one hour and fifty-seven seconds. The same year Topgallant and Betsy Baker were matched to trot three miles in harness for $1,000 a side. The race was won by Topgallant by 40 yards, in 8 minutes, 42 seconds. Topgallant also trotted 12 miles on the road in 39 minutes. The "Albany pony" did a mile in 2 minutes, 40 seconds. The Treadwell mare did one mile in 2:34; and Boston Blue trotted 18 miles within the hour. Boston Blue is reported to have been the first horse that trotted a mile in three minutes; it having been done in 1818. So that it will be seen that the Treadwell mare in 1824 had reduced the time to 2:34. Yet for many years after, a 2:40 horse was considered extraordinary, as also was any horse capable of going on the road in 3 minutes.

In 1827, on the Hunting Park Association course of Philadelphia, Screwdriver won two heats at two miles, beating Betsy Baker in 8:02 and 8:10, the third best time on record. Dutchman afterwards accomplished the same distance in 7:32½, and Lady Suffolk in 7:40½.

In 1840, on the Long Island course, Jerry beat Whalebone in a three-mile trotting race, in 8:23 the first heat, and 8:15 the second. The best time for 2 mile heats that year was 5:22, 5:21; for 3 miles, 8:26, 8:27, 8:41, 8:56. On long distances Sweetbrier accomplished six miles in 18:52.

In 1834 Edwin Forrest, as yet an unentered horse, trotted his mile in 2 : 31½, beating Sally Miller. The course was 1 mile and 10 yards in length.

In 1835 Dutchman made four miles, under the saddle, in 11 : 19 and 10 : 51, and Dolly, by Messenger, out of a thoroughbred mare, five miles to wagon, carrying two men, weighing 310 pounds, in 16 : 45 ; and immediately was started again to do 10 miles more, which she accomplished in 34 : 07. The same year the horse Daniel D. Thompkins, under the saddle, trotted three-mile heats in 7 : 59 and 8 : 10.

In 1842 Ripton beat Lady Suffolk, at three miles in harness, in 5 : 07 and 5 : 17.

In 1843 Lady Suffolk made mile heats in 2 : 28½, 2 : 28, 2 : 28, 2 : 29 and 2 : 32, which was not again equaled until 1854, when this record was covered by Tacony.

In 1844 Cayuga Chief made the first half-mile of a race in 1 : 15, the fastest yet made in public ; and Fanny Jenks accomplished 100 miles in harness, in 9 hours, 38 minutes and 34 seconds. The slowest mile was done in 6 : 25 and the fastest in 4 : 47. At the end of the race this mare was driven an extra mile in 4 : 23.

In 1849 Lady Suffolk trotted 19 times and won 12, beating Gray Eagle and Mac twice, Pelham five times, Lady Sutton twice, Trustee four times ; also beat Black Hawk, Gray Trouble, Plowboy and other horses. This year a Canadian mare, Fly, is said to have been driven from Cornwall to Montreal, ninety miles, in 8 hours and 15 minutes. Fanny Jenks made 100 miles in 9 hours 38 minutes and 34 seconds. Fanny Murray trotted 100 miles in 9 hours 41 minutes and 23 seconds.

In 1852 Tacony won 12 races, beating all the best horses of the day, making a single mile in 2 : 26 ; two miles in 5 : 02 and was beaten only twice. As a 3 year, Ethan Allen trotted this year in 3 : 20. Flora Temple this year won her first purse, on the regular turf, in 2 : 41.

In 1853 the entire sporting interest was centered in Flora Temple and Tacony. Flora this year beat all the best horses of the day winning seventeen times. Her best time at mile heats was 2 : 27, 2 : 28, and at two-mile heats 5 : 01½, 4 : 59. This year Tacony trotted a mile in 2 : 25½.

In 1856 the contest lay principally between Flora Temple and Lancet. Flora made 11 races, winning 9, beating Lancet four times in harness, and Tacony three times in harness, Tacony going under the saddle. This year Flora Temple lowered the one-mile record to 2 : 24½.

IX. Strains of Trotting Blood.

That the trotting horse of America owes his great powers to the infusion of thorough blood, we have before stated. To Imported Messenger

is this due in the greatest degree. Another great trotting sire of America was Imported Bellfounder. There has been much controversy over his breeding, first and last, but that he was a staunch trotter and a getter of admirable horses, there is no doubt, giving splendid action to his get. Still, it must be admitted that, admirable as was Bellfounder himself, his get was not equal to the descendants of Messenger in all that constitutes speed, endurance and action.

Duroc also became a valuable factor in our trotting blood. His strain of blood appears in the Medley's, Duroc Messenger's, Mambrino Chief's and Gold Dust's.

One of the sub-families of Messenger's blood, Hambletonian, who united the blood of Messenger and Bellfounder, has raised the trotting horse of America to the highest point of perfection. He was not a handsome horse from a thoroughbred standpoint, if indeed he was thoroughbred, which has been doubted. His pedigree has been given as follows: Hambletonian was by Abdallah; he by Mambrino, a son of Messenger. The dam of Abdallah was the mare Amazonian. The dam of Hambletonian was by Imported Bellfounder; second dam by Hambletonian; third dam, Silvertail, said to have been by Imported Messenger

In all that constitutes stoutness and ability to perform, in freedom from tendency to disability, his stock has been wonderful. Noted for immense and strong joints, length and strength of bone, magnificent muscular development, prominent, square, massive build, mighty hips and excellent barrel, all knit together to form a most admirable frame, united to a nervous constitution that reproduced itself in his descendants, in a most wonderful degree.

In relation to the descendants of the progenitors of the strains of trotting blood, Mr. H. T. Helm, in his work, "American Roadsters and Trotting Horses," says of the trotting horse of to-day: "The combined Abdallah-Bellfounder is a horse of the teens; Goldsmith Maid, 2:14; Dexter, 2:17; Gloster, 2:17; Bodine, 2:19¼; St. Julian, 2:22½; Gazelle, 2:21; Fullerton, 2:18; Mountain Boy, 2:20¾; Jay Gould, 2:21½; Nettie, 2:18; Startle—. Joe Elliot would, in his opinion, have stood as a bright star in the firmament." We can add to this our own opinion as a breeder of descendants of Messenger and Bellfounder many years ago, that we never had a disappointing colt. They were mighty driving horses, of great bone, muscle and sinew, of great lung power, and, of course, of great endurance.

CHAPTER IX.

THE BREEDING AND REARING OF COLTS.

I. IMPORTANCE OF ACCURATE KNOWLEDGE.——II. BREED FROM MATURE ANIMALS.——III. NO PROFIT IN INFERIOR HORSES.——IV. HEREDITY IN ANIMALS.——V. PECULIAR ORGANIC STRUCTURE.——VI. HEREDITY OF DISEASE.——VII. AVATISM OR BREEDING BACK.—BREED TO NONE BUT THE BEST.——VIII. VARIATION AND DEVELOPMENT.——IX. TRANSMISSION OF QUALITIES.——X. THE IMPRESS OF COLOR AND FORM.——XI. RELATION OF SIZE IN SIRE AND DAM.——XII. BREED ONLY FROM PURE SIRES.——XIII. THE BEST ARE CHEAPEST IN THE END.——XIV. SELECTION OF STALLION AND MARE.——XV. SERVICE OF THE STALLION.——XVI. THE PERIOD OF GESTATION — TREATMENT.——XVII. TREATMENT AFTER FOALING.——XVIII. HOW TO KNOW IF A MARE IS IN FOAL.——XIX. HOW TO KNOW THE FOALING TIME. XX. THE FOALING STALL.——XXI. ABORTION, OR SLINKING THE FŒTUS.——XXII. HOW TO RAISE A COLT.

I. Importance of Accurate Knowledge.

The breeding and raising of farm stock is one of the most interesting branches of agricultural art, and it is one requiring judgment and accurate knowledge in a high degree. In the preceding chapters we have therefore, carefully gone over the ground covered by what pertains to the anatomy and physical condition of the horse, to the end that any intelligent person may become so thoroughly master of the subject that he may not only know what constitutes a good horse, but may also decide with tolerable accuracy as to the age and constitutional vigor of an animal, and be familiar with the characteristics of the principal breeds.

Know what You Breed For.—A horse should be bred with a view solely to the labor he is to perform. The first thing for the breeder to do, therefore, is to decide what he wants with the horse. If the animal is intended for the turf, there is but one course to pursue ; breed only to horses of the most approved pedigree, for the distance, whether it be one, two, three, or four miles. It is well known that but a moiety of the colts, even of the best blood, ever arrive at high eminence. So many are the contingencies to be met, and so many the risks to be taken, that our advice is, Do not undertake the breeding of this kind of stock, unless you are amply able to provide all the varied requirements, including the most perfect stables, and a training track. Above all, do not waste money on the so-called thoroughbreds, that travel country districts, expecting to breed high-priced horses from common mares. You would be quite as likely to be struck by lightning as to succeed in getting anything better, from such parents, than a quarter nag for a scrub race. So with trotting horses, do not expect to get a crack trotter unless the blood of trotting thoroughbreds is strong in the veins of sire and dam. Nor can you get a fine carriage driving horse from some weedy, dancing,

high headed sire, whose nervousness comes from timidity, and whose blood is made up from guess-work breeding. Read carefully what is contained in the preceding chapters, and breed from stock, already improved, rather than seek to make a breed yourself.

If you desire to breed up from the stock you already have, the object is a laudable one, provided you want horses only for general use. In this case, breed from the best sires you can find, and those which combine the characteristics you seek to perpetuate.

II. Breed From Mature Animals.

Maturity in breeding stock is indispensable, since it is futile to expect to get the best development from animals undeveloped themselves. We believe the weediness of many thoroughbreds, which means want of development and lack of constitutional vigor, to be the result, in part, of too early and fast work, and also of breeding their parents while yet too young, or after they were broken down for service on the turf. To get the highest excellence in the offspring we must have the highest development in the parents. Degeneration will surely result, if we breed from immature or broken down animals. Another important requisite is, that the sire be given plenty of exercise during the season of service; and after that, and until the next season begins, he should have constant work, except for a period of rest with a run on the grass immediately after the service season. The mare also should not be idle, nor confined to the stable; exercise is as necessary to the dam as to the sire.

III. No Profit in Inferior Horses.

The best and purest stock, well adapted to the end sought, is always the cheapest. This is a fundamental principle, to be kept constantly in view. It costs no more to feed, shelter, and properly care for good stock, than it does to feed, shelter and care for inferior stock. The first cost of good animals is, of course, more, but this is the capital invested, and for which you expect to get adequate returns. It costs no more to raise good stock than it does to raise inferior stock. It costs no more to fit and train the one than the other. After you have secured the female stock, smooth in movement, of undoubted constitutional vigor, and of the proper blood for the labor intended, if you do not own, or cannot afford to own, the sire, you need not fear to pay liberally for such blood as you require; you may, moreover, safely incur the expense of sending your mares considerable distances to procure the proper sire. This, however, will rarely be necessary unless you wish exceptional colts; for, in all well-settled districts, there are plenty of good sires, outside of the highest-caste thoroughbreds, and trotting strains. In thinly-settled districts the breeding of high-caste stock should not be undertaken unless the

breeder can afford to keep the sires at his own expense or by co-operation, or in partnership, with others.

Taking it for granted that the reader accepts, as true, the foregoing propositions, we will next inquire into some points that should be borne in mind by every one who hopes to win success as a breeder, whether from the stand-point of profit or with a view to the pleasure of doing a thing well.

IV. Heredity in Animals.

We have dwelt with some emphasis upon the importance of breeding from sound, vigorous parents; for like produces like, and the rule is constant even in the case of phenomenal animals. Extraordinary development is by no means the result of chance, though it may be the bringing out in an extraordinary degree, of qualities that have been dormant, perhaps for generations, for the want of what breeders call nicking. By "nicking" is meant the development of dormant traits through the union of a sire and dam of peculiar qualities, of the most excellent traits perfectly blended together, and conferring vigor of constitution, soundness and fineness of bone, along with great muscular development, good digestion and excellence of the respiratory organs, and of the nervous system, and nerve force. With these, an animal must be good; and how to have them good is the object of this work.

Let us now see what goes to make up that quality called heredity, which is carried in the breeding of an animal. Charles Darwin has written voluminously and conclusively on this subject, as have many others. Dr. Miles, late professor of Agriculture in the Michigan State Agricultural College, in a treatise on the laws of development and heredity, in relation to the improvement and breeding of domestic animals, has collected and arranged much valuable matter bearing upon this subject; and he cites heredity of normal characteristics, atavism, variation, the relative influence of parents, influence of previous impregnations, and various other matters, as being well worth the study of the breeder. The position we have assumed is, therefore, founded upon correct and long-continued observation by the most eminent minds of this and other ages; for more than a glimmering of the laws of heredity was had even by the ancients. In classic times there were families of athletes among the Greeks; and the extract already given from Xenophon shows that he no less understood what a horse should be, than he did how to conduct the memorable retreat of the ten thousand, and to fight successful battles. Later researches by Galton have shown that the best wrestlers and oarsmen belong to a small number of families in which strength and skill have become hereditary. The most successful of our trotting horses are

derived from three families; of these the descendants of Messenger are most strongly marked in hereditary trotting qualities. Among running horses Eclipse begat 334, and Herod 497 winners. The hereditary transmission of strongly marked peculiarities in races is conspicuously shown in the Jews and in the Gypsies, who intermarry, each, only, among their own race. Hence, says Ribot, "their distinguishing characteristics have remained the same for centuries." So, certain breeds of sheep, as the Spanish Merinos, certain breeds of cattle, as the Devons, like certain breeds of horses, are strongly characterized by their hereditary traits and tendencies.

V. Peculiar Organic Structure.

No less remarkable is the tendency, sometimes seen, to inherit abnormal organic structure. A peculiar structure of the ear, nervous system and vocal organs, gave to the family of Sebastian Bach, that power which in eight generations produced no less than twenty-nine eminent singers. Fecundity, length of life, abnormal peculiarities of members of the body, day-blindness, total blindness, peculiar forms of infirmity, and of disease, are well known to be hereditary in some human families. According to Finley Dun a tendency to consumption and dysentery in cattle is indicated by certain well marked signs; the most obvious of which, he says, are a thin and long carcass, narrow loins and chest, flat ribs, a hollow appearance at the flanks, extreme thinness and fineness of the neck and withers, hollowness behind the ears, fullness under the jaws and a small, narrow muzzle. All these are indications of defective nutrition, and will apply generally, not only to cattle, but to other animals; and defective nutrition is the parent of disease.

VI. Heredity of Disease.

Of 1000 cases of insanity noted in France, 530 were hereditary. In the family of Le Compt, thirty-seven children and grand-children became blind like himself, and in this case the blindness, for three successive generations, occurred at about the age of seventeen or eighteen years.

Blindness is well known to be hereditary in horses. Spavins, curbs, ring-bones, strains of the back tendons, swelling of the legs and grease, roaring, thick wind, chronic cough, partial as well as total blindness, malignant and other tumors, epilepsy and various nervous affections, are also distinctly hereditary in the horse, and often do not appear until mature age. Hence, it is necessary to know that the stock you breed from is not only sound, but that it came of sound ancestry; for disabilities may lie dormant for one, two or three generations, and then appear.

The predisposition most to be guarded against in horses, is hereditary disability in the bone, sinew, viscera, and especially in the sight. Defective sight leads to shying, fright and consequent unmanageability, and is therefore dangerous in the extreme.

VII. Atavism or Breeding Back.

In breeding, if an abnormal characteristic appears in any of the young, and this is found to be valuable, it should be sedulously preserved and fostered. What is called breeding back or throwing back, may occur after the lapse of many years. The occasional appearance of horns in Galloway cattle is a case in point. Mr. Darwin mentions the occurrence in two of a litter of Essex pigs, of marks of a Berkshire cross, that had lain dormant for twenty-eight years. The reproduction of a peculiarity of an ancestor, near or remote, whether of form, color, mental trait or predisposition to disease, is termed atavism. It is a valuable trait when good qualities are thrown, and they are likely to be, if the good qualities are inherent. It is to be guarded against, if the qualities transmitted are bad. Hence we have laid it down as a rule: Breed to none but the best.

VIII. Variation and Development.

Variation is among the rarest of the occurrences that the breeder ever encounters. It is in fact not susceptible of proof that distinct and well-marked variation of a race is possible. Its occurrence is probably due to the throwing back to some long dormant quality of a remote ancestor. Wild animals do not change; among them one is like the others. If transported, they may be dwarfed in size, and acquire a more abundant covering of hair, while their stomachs and other organs may become modified to suit the changed conditions in a rigorous climate, or, with warmth and abundant food they may be increased in size and general development. But this is not what we understand by variation, which is not some sudden change in the species. Variation is rather the departure of the individual from the well-known traits of his species or family, and is due, as already stated, to avatism or breeding back to some ancient ancestor, and to some remote cross or mingling of blood. Species may acquire certain traits by development, but the process is gradual, and when once attained the traits may be perpetuated. This development is most gradual in horses, somewhat quicker in cattle, yet faster in sheep, and still more so in swine. Horses breed but once a year, mature the most slowly of all farm animals, and rarely produce more than one young at a birth. Cattle mature faster, breed younger and frequently produce twins. Sheep mature still faster, and often produce two or more at a birth, while swine mature rapidly, breed young, and produce many at a birth.

IX. Transmission of Qualities.

In breeding, there are two points to be taken into consideration, in relation to the transmission of the qualities of the sire and dam. As a rule the sire of pure blood, coupled with a "cold-blooded" mare, by which we mean a mare of mixed blood, will get a foal more strongly resembling himself than the mare. Some sires have this power of impressing their characteristics upon the progeny in a remarkable degree. A fact that is still more striking is that some females have the faculty of bringing young remarkably like the sire. This is a species of atavism. If a mare possesses this peculiarity, she is invaluable, and if of pure blood should never be served by any but the best sires. If of cold blood then she should be served by a sire of like peculiarity as to the transmission of blood, and possessing the qualities which are wanted in the foal. Again, the oftener a female is served by the same sire, the stronger will be the likeness of the progeny to the sire, as a rule; and the oftener the sire is changed, the greater will be the danger of variation in the progeny. Hence, the absolute importance of breeding in such manner that the blood sought will be more and more impressed with the characteristics required; and, hence, again, the imperative necessity that the first time a female, especially one of pure lineage, is allowed to breed, it be not only to an animal of known purity of blood, but to one bred in the same line, that is, having the same qualities as herself; for, not only is the dam impressed with the blood of every sire with which she has had contact, but the first impress is stronger than any succeeding one. It is not necessary here to go into a demonstration of these facts. They are so well established that they may be taken for granted.

X. The Impress of Color and Form.

Breeding to color is also an important point to be considered. Never use a parti-colored stallion, but always use one of self-color. Bays and chestnuts with darker manes and tails are the best colors, as a rule. These colors may be broken with white at the fetlocks, and by a star in the forehead; but too much white should be avoided, while "calico markings" are the least desirable of all. Certain breeds have characteristic colors, as the gray in the Percheron, bays and browns in the Clydesdales, and black in the English cart horse. Adhere to definite colors, whatever they may be; if others incline to crop out, especially marked ones, be sure they are due to atavism, from some near or remote cross.

With regard to form, the rule more generally acknowledged to be correct, and the one borne out by many facts, is, that the sire impresses outward form and color to a great degree, and the mare the inner and physical form to a corresponding degree. If the sire be of the purest

lineage, his impress, all through, will be the stronger, and if the mare be the purest, her characteristics will predominate. In breeding up to a higher standard, be sure, therefore, that the sire is of the purest and the most strongly marked characteristics, as to impress of blood.

XI. Relation of Size in Sire and Dam.

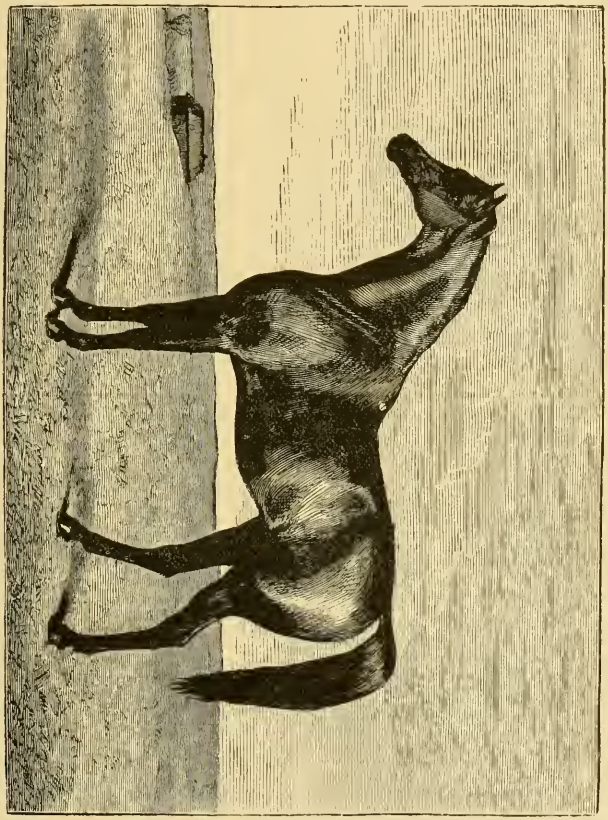
In the production of full-formed, vigorous and symmetrical animals, if it is desired to increase the size, the mare should be relatively larger than the horse. But if the size is correct, according to the breed, select sire and dam of relative size; that is, select a sire proportionately larger than the dam, according to the breed. In Devon and Hereford cattle, for example, the cows are smaller than the bulls, wherein they contrast with the Short-Horns, where the relative size between male and female corresponds more nearly with the relative size of horse and mare. Above all, never make the mistake of attempting to breed-up the size by using overgrown males. Such an experiment must always end in disaster, as many farmers have found by breeding small mares, which they happen to have, to some coarse, large-boned horse, with the idea of getting large, able-bodied colts. At the time when overgrown horses were fashionable in England, for coach and carriage teams, the farmers of Yorkshire attempted to breed such animals from overgrown stallions on small mares. The result was a dismal failure. The converse of this has been seen in this country, in breeding pony Morgans upon much of the farm stock with a view of getting fine horses. The outcome was stock too small for labor, and not good enough for anything like road horses. The results of this mistake may yet be seen in some parts of the country, in undersized animals.

XII. Breed Only From Pure Sires.

In-and-in breeding, as already stated, as the breeding together of animals closely related, as the progeny of one sire and dam or members of the same distinct and closely related lineage. Cross breeding is the union of two distinct sub-families of the same tribe. Hybrids are the produce of two distinct tribes of a family, as for instance in the *genus equus*, of the mare and ass, or the mare and zebra, or of the mare and quagga. Cross-bred animals are fertile; hybrids are not. Breeding in line is the union of animals closely enough related to possess similar characteristics. In this connection it will be sufficient to state conclusions founded upon experience and facts. The data may be found in the records of herd and stud books, and in works dealing in specialties relating to physiology, anatomy and breeding.

If it be desired to keep a stock absolutely pure, and to retain the well-known characteristics of a breed in their best form, the proper plan is to

breed to line with individuals having the distinct points required. If the object is to breed-up, to found a breed, or to refine certain points and characteristics with a view to their perpetuation, it will be safe to breed in-and-in, or closely, for three generations, and then take an out



"DERVISH."

cross, or breed to line, as the case may be. For ordinary purposes, where stamina, strength of constitution, and not exceptionally constant characteristics are required, crossing is not objectionable, though violent crosses, as heretofore stated, must not be allowed. Breed your females to the best male you can find, having due regard always to the point that the

female must not be bred to a male widely different from herself. Good mares of the common mixed breed may be bred to staunch thoroughbreds to refine, and to give style, symmetry and speed to the foals; to Percherons, or Clydesdales, to increase the size and strength for draft; to the Cleveland Bay, to beget handsome, able horses for the farm and carriage, and to well-bred trotting stock to get good horses for the road, and for all work.

As illustrating our meaning, if the reader will turn to the portrait of Gold Dust, a horse of mixed blood, got by Vermont Morgan, out of a dam nearly or quite thoroughbred, it will serve to show a result of cross breeding. The progeny partakes more of the thorough than of the mixed blood. The cut of Shales, a half-bred horse foaled in England, early in the century, and noted during his whole life as a most wonderful trotter, shows the result of a thoroughbred sire, with a dam of mixed lineage. Here the preponderance is in favor of the thoroughbred sire. The cut of Dervish shows an example of pure breeding, and probably of close, or at least line, breeding. He was a little bay Arab, of great style and fineness, remarkable for his darting, square trot; that is, for throwing out the fore-leg, and straightening the knee before the foot touched the ground.

VIII. The Best are Cheapest in the End.

The highly-bred trotters of to-day, those quite or nearly thoroughbred, show the value of breeding in line, that is, we repeat, the breeding together of animals of close descent, or those having characteristics in common. Many of our best thoroughbred racers show examples of in-and-in breeding, and, as a rule, those bred in the same line of descent are more uniform in their qualities, than those which have been produced by the union of many sub-families of the same original blood. The objection to close in-and-in breeding is, that, if persisted in, it will ultimately result in weakening the constitution, while at the same time it refines. To establish a breed it must be closely followed, departing from the rule only when undue delicacy of constitutional vigor is feared. In the wild state, gregarious animals, such as horses and cattle, breed in-and-in for two or three generations, or until the strongest males become enfeebled with age, or are obliged to succumb to younger and more vigorous ones; which is in accordance with the principle of the survival of the fittest, and may be called a modification of in-and-in breeding alternated with breeding to line. The same rule would be a sound one, if modified by careful selection, in the artificial breeding of domestic animals, always keeping in mind that in sheep, and especially in swine, the rule must not be so closely followed. But in all this, remember constantly that the

best are always cheapest in the end. It is true that the breeder's purse must be considered; but, be he rich or poor, it is always a money-losing business to breed to an ill-formed male because he is cheap.

XIV. Selection of Stallion and Mare.

The selection of the stallion, while it will depend primarily upon what the colts are intended for, should always be for the good there is in him. He should be of full medium-size for the breed, and should possess the characteristics we have previously stated, in writing of breeds. He should be masculine in every fiber, with the distinguishing beauty, strength, fire and courage of the male. Never breed to a feminine-looking male. The outcome will always be a failure.

Selection of the Mare.—The selection of the mare is no less important. It is she that is to nourish the fœtus, and after birth give suck to the young. The mare, whatever her size, should not be coarse at any point. Her beauty needs to be feminine, just as that of the stallion must be masculine. She should carry more muscle or flesh than the horse, be more rounded in outline, but be finer in head, neck and limb, and thinner in mane and tail than the stallion. Her strength should be that of fleetness, her fire that of docile playfulness, and her courage that of ambition to perform. She should have a larger pelvis, relatively, than the horse, and her barrel should be rather rounder and more roomy. Her milking qualities should of course be good, for upon them depends, in a great measure, the future usefulness of the colt.

XV. Service of the Stallion.

The mare may be served just as she is coming into heat, but better just after her greatest passion of heat has passed. The best time for service is early in the morning. After being served let her remain quiet, or, if she seem fretful, walk her slowly about, and, after fifteen minutes, turn her into a pasture that she may amuse herself eating grass; but not in a pasture where there is other stock. A mare will usually receive the horse on the eighth or ninth day after foaling, even though she exhibit no particular sign of heat; if not, she may come into heat when the colt is about four weeks old.

Treatment after Service.—After being served, try her with the horse on the ninth day; if she refuse, try her again on the seventh day following; upon a second refusal, try her again on the fifth day after that; if she then refuse, she may be fairly conceded to be with foal. Above all things, the mare should be kept away from teasing horses; from badly castrated geldings; from ridglings, or horses imperfectly gelded, and bearing one testicle in the body; from yearling colts, and from other mares in heat. When once the time of heat is known, and service given, the

mare should be returned to the horse as recommended, so that the time may not run over when the mare should receive the horse. Forty-four weeks being the usual time the mare goes with foal, if the service of the stallion is delayed it will bring the birth of the next foal too late, perhaps, in the next year; and, possibly one year may have to be intermitted in breeding.

XVI. The Period of Gestation.

Gestation, the carrying of the young, continues, on an average, eleven months or forty-four weeks. This period may, however, according to the observations of Mr. Youatt, be diminished by five weeks, or extended by six weeks. Thus it will be seen that there is a variation of nearly eleven weeks, or nearly three months. M. Fessier, a French observer, counting 582 mares, finds the longest period 419 days, the shortest 287 days and the average 330 days. In an observation by M. Gayot on twenty-five mares, the average was 343 days, the longest period 367 days and the shortest period 324 days. Small mares, as a rule, go a shorter time than large ones, and a mare is apt to carry a horse colt longer than one which is a female. The observations of M. Fessier may be taken as the most conclusive, since they were extended over a period of forty years.

Treatment During Gestation.—The mare should not be worked immediately after being served. Once quieted, it is proper that she have ordinary work until within about three months of the time of foaling. After this she may do light work, not fast work, with benefit to herself and the foal. Care, however, must be taken that she do not slip or strain herself, nor fall down

XVII. Treatment After Foaling.

After foaling, and until the colt is a month old, the mare should do no work. In fact, no valuable mare should do any work, certainly not more than enough for exercise, until the colt begins to eat grass and grain freely. There are more colts dwarfed, and mares injured, by the dam being worked hard while suckling the colt, than at any other time, and by all other means whatever. She is then weak, liable to become overheated, and any disability experienced by the mare will surely be participated in by the foal.

XVIII. How to Know if a Mare is in Foal.

As already stated, if the mare refuse the horse upon the third trial, or the twenty-first day after service, she may be considered to be with foal. Between these trials, however, if the mare be not gravid, or in foal, the lips of the vagina will be moist, bright, and of a fresh florid

appearance, and with a fresh drop of fluid at the lower part, which being touched will incline to extend. If she be gravid, the surface of the vagina will be dry and of a dirty brown or rusty color, while the drop that before was clear fluid, will be dark and brown. After the third month, the belly will begin to swell, and at the end of the fifth or sixth month the movements of the fœtus may be seen by watching; or by standing the mare at rest and pressing up sharply in the flank, with the thumb and fore-finger closed, the fœtus may be distinctly felt by the rebound.

XIX. How to Know the Foaling Time.

From one to three months before the time of foaling, the udder begins to fill and swell, more or less, and this will continue increasing. During the three weeks immediately preceding the time of foaling, a furrow-like appearance is seen, reaching from the haunch to the tail on each side of the spinal extension, as though the pelvis was separating its parts. This will be more and more apparent as the time approaches. The udder will fill, and two days, generally, though sometimes only one, before foaling, a gummy substance will exude from, and stand at the end of, each teat.

XX. The Foaling Stall.

Whatever the place provided for foaling, it should be so tight that the mare cannot get her limbs through the interstices. It should be warm and well-littered with short, fine straw, and the mare should be left entirely to herself, except in those rare cases when she may need mechanical assistance in foaling. This, however, should not be resorted to unless the size of the fœtus requires it, or a false presentation is made.

XXI. Abortion, or Slinking the Foal.

From the time when gestation has proceeded three months, and up to the fifth month, there may be danger of abortion. To prevent this, the mare should not be exposed to foul smells, nor to the sight of blood or dying animals, nor should she be allowed to be frightened. She should have better feeding, and less work, since from this time on her system will be called on to nourish the fast-growing fœtus. There are many causes of abortion. Among the most prolific are, allowing her to see food given others, that she does not get herself, and which she likes; sudden fright; sympathy with the distress of other animals; and above all, the germs arising in a stable in which there has been an abortion.

The prevention is to avoid all these things, and to allow the animal plenty of fresh air. If an animal once aborts, unless it is brought on by strain or acute disease, or if once the tendency is established, it is somewhat difficult to overcome the predisposition, which generally arises at about a concurrent period of gestation. Hence, great pains should be taken to prevent any liability to this disaster.

XXII. How to Raise a Colt.

The colt should be allowed to run with the dam until it is about six months old. The mare should have plenty of grass, and such other food as may be necessary to keep up her condition. If, at weaning time, the mare do not dry off kindly, the milk should be drawn by hand, often enough to prevent inflammation; keeping her on dry food will assist in the process of drying, especially if she be put to steady but light work. At all events she should have plenty of walking exercise daily. The colt should be handled and fondled from the time it is a week old, if strong, and a light halter should be put on, to lead it by. Thus it early becomes accustomed to the master, and if kindly treated will soon come to seek the fondling hand. As soon as it will eat, say at three months old, it should be accustomed to a little crushed oats daily, and the mess may be increased from time to time, until it gets a full ration, at six months old.

Many persons suppose that a colt needs no water. Nothing could be further from the truth. After it is a week old, the colt should be offered water once a day, at noon, and as it increases in age, oftener. When ready to wean, it will already have been accustomed to lead by the halter. Tie it securely where it may not hurt itself, preferably in sight of the mare; feed it generously, give it plenty of water, and allow it to run at play every day.

CHAPTER X.

ASSES AND MULES.

I. THE MULE AND HINNY DEFINED.——II. THE ASS.——III. ANTIQUITY OF THE MULE. IV. BREEDING-JACKS.——V. LONGEVITY OF THE MULE.——VI. THE VALUE OF MULES FOR LABOR.——VII. MULES ARE NOT VICIOUS.——VIII. THE BREEDING OF MULES.

I. The Mule and Hinny Defined.

The word mule signifies a hybrid, that is, the offspring of animals belonging to the same genus, and fertile one with the other, but of different species. Mules or hybrids are usually infertile, one with another, and are always incapable of propagating the species indefinitely. As now generally accepted, the word mule is used to designate the offspring of the male ass with the mare. They have been known and bred since the time of remotest history, having always been prized for their longevity, sure-footedness, and ability to labor in extreme heat.

The Hinny.—The hinny is the produce of a she-ass, bred to a horse. They were called *hinnus* by the Romans;—hence, our name, hinny. They resemble the horse more than the ass, just as the mule, sprung from the mare and ass, resembles the male parent most. Hinnies are handsome, round-bodied like the horse, but exceedingly small, and are also said to be slow and more difficult to manage than the mule proper. They have, therefore, seldom been bred, and when so, soon passed into disuse.

II. The Ass.

The wild ass is said to have been indigenous to Arabia Deserta, and the countries which formed the Babylonian Empire. Those now found in the northern region of India are said to be so fleet, in the hill country, that no horse can overtake them. Four different races seem to be indicated in the Hebrew Scriptures, where they are named *Para*, *Chamor*, *Aton* and *Orud*. Of the wild ass Para, Scott's version of the description by Job is as follows:

> "Wild tenant of the waste, I sent him there
> Among the shrubs, to breath in Freedom's air.
> Swift as an arrow in his speed he flies;
> Sees from afar the smoky city rise;
> Scorns the throng'd street, where slavery drags her load.
> The loud-voiced driver and his urging goad:
> Where e'er the mountain waves its lofty wood,
> A boundless range, he seeks his verdant food."

III. Antiquity of the Mule.

Mules were used and much prized from a remote antiquity, and are mentioned both in sacred and profane history. They were introduced into the chariot races in the 70th Olympiad, or about 500 years before the Christan era; and in the time of the Romans, Q. Axius, a Roman Senator, paid, according to Pliny, 400,000 sesterces, or more than $13,000, for a male ass, for the stud; and he also states that the best female asses were worth a like sum to breed sires. When we compute the difference in value between money then and now, the price was greater than that now paid for the most celebrated racing and trotting horses.

IV. Breeding-Jacks.

The best jacks now are those of Spanish origin. They are large, strong-boned, long-bodied, and, of course, long-eared. The cut will give a good representation of the Poitou ass, an animal similar to the Spanish jack. The jack, whatever the breed, is sensitive to cold, and to the influence of storms, and, if not warmly housed in winter, soon becomes useless and disabled, from rheumatic and other affections. Of the jacks imported at an early day into America, as a present to General Washington, Mr. Custis has written as follows:

"The *Royal Gift* and *Knight of Malta*, were sent to General Washington about the year 1787—the *Gift* with a jennet, a present from the King of Spain; and said to have been selected from the royal stud. The *Knight*, I believe, was from the Marquis de Lafayette, and shipped from Marseilles. The *Gift* was a huge and ill shapen jack, near sixteen hands high, very large head, clumsy limbs and to all appearance little calculated for active service; he was of a gray color, probably not young when imported, and died at Mount Vernon but little valued for his mules, which were unwieldy and dull. The *Knight* was of a moderate size, clean limbed, great activity, the fire and ferocity of a tiger, a dark brown, nearly black colour, white belly and muzzle; could only be managed by one groom, and that always at considerable personal risk. He lived to a great age, and was so infirm towards the last as to require lifting. He died on my estate in New Kent, in the state of Virginia, about 1802 or 1803. His mules were all active, spirited, and serviceable; and from stout mares attained considerable size.

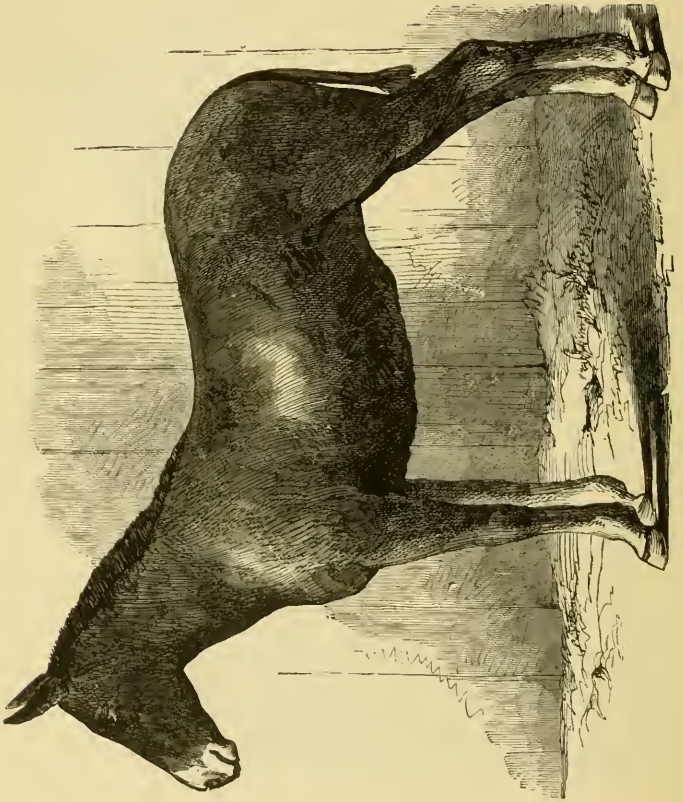
"General Washington bred a favorite jack called *Compound*, from the cross of Spanish and Maltese—the *Knight* upon the imported Spanish *Jennet*. This jack was a very superior animal; very long bodied, well set, with all the qualities of the *Knight* and the weight of the Spanish. He was the sire of some of the finest mules at Mount Vernon, and died from accident. The General bred mules from the best of his coach

mares, and found the value of the mule to bear a just proportion to the value of the dam. Four mules sold, at the sale of his effects, for upwards

A POITOU ASS.

of $800: and two more pairs at upwards of $400 each pair; one pair of these mules were nearly sixteen hands high each.

"From these jacks a compound breed were produced, that, when bred to large mares, were unexcelled for size and activity."



A HIGH-CLASS KENTUCKY MULE.

The breeding of jacks and jennets, as the female of the ass is called, is confined to but few hands. These breeding studs are mostly located in Kentucky and Tennessee, though some are found in Ohio, Indiana, Illinois and Missouri. Up to the time of the late war the breeding of this stock was an important industry, the jacks produced being distributed for service all over the Southern and Western States. Since the war, with the breaking up of the great breeding studs, the industry has languished, owing to the decreased demand for mules. A new impetus,

YOUNG SPANISH JENNET.

however, has given rise to the breeding of jacks again in considerable numbers in the South, and this branch of husbandry will undoubtedly again assume more than its original importance; for the agricultural interests of that section are steadily growing, and a constant improvement is noted in the quality and numbers of the live stock.

What the jacks should be may be seen in the illustration of a Poitou ass, a modification of the best form of the Spanish jack, on page 159, and that of the best form of the mule in the cut on page 160, showing the manner of trimming, (roaching) the mane and tail. The cut of a Spanish jennet given above will also convey an accurate idea of the best form of jennet.

V. Longevity of the Mule.

The longevity of the mule is proverbial. It was a common saying during the civil war that "mules never died;" they might sometimes be knocked over by a shot, but if one ever died a natural death the army wags refused to credit or record the fact. Pliny gives an account of one, taken from Grecian history, that was eighty years old; and though past labor, followed others, that were carrying materials to build the temple of Minerva at Athens, and seemed to wish to assist them; which so pleased the people, that they ordered he should have free egress to the grain market. Dr. Rees mentions two that were seventy years old in England. Mr. P. S. Skinner says, "I saw myself, in the West Indies, a mule perform his task in a cane mill, that his owner assured me was forty years old;" and adds, writing nearly twenty years ago, "I now own a mare mule twenty-five years old, that I have had in constant work twenty-one years, and can discover no diminution of her powers; she has within a year past often taken upwards of a ton weight in a wagon to Boston, a distance of more than five miles. A gentleman in my neighborhood has owned a very large mule about fourteen years, that cannot be less than twenty-eight years old. He informed me, a few day since, that he could not perceive the least failure in him, and would not exchange him for any farm horse in the country. And I am just informed, from a source entitled to perfect confidence, that a highly respectable gentleman and eminent agriculturist, near Centerville, on the eastern shore of Maryland, owns a mule that is thirty-five years old, as capable of labor as at any former period."

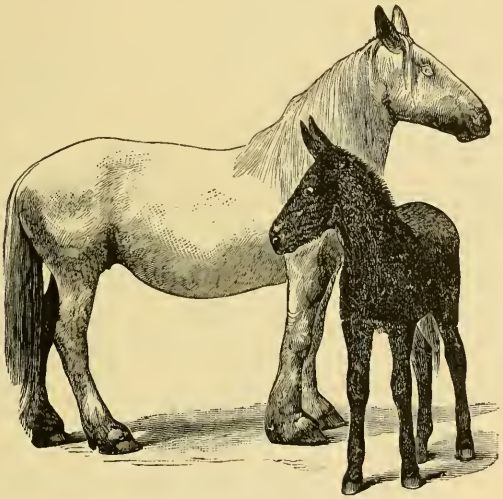
VI. Value of Mules for Labor.

It is beyond dispute that mules will continue to labor for at least double the period of the usefulness of the horse. They endure extreme heat better, but are pinched with cold. It is a mistake to suppose that the mule will subsist on far less food than the horse. In proportion to size, they require about the same quantity; but, weight for weight, they will draw a heavier load; and, for the reason, that they take little notice of what is going on about them, do not fret and seldom scare. As pack-animals, they are far superior to the horse; while, in sure-footedness and freedom from disease, no farm animal, except the goat, can compete with them. The impression that mules can get along with little or no care, and that they may be turned out in the winter to shift for themselves, has led many people to be disappointed in their use. In summer, when a horse would seek the shade, we have seen mules lie prone in the sun and enjoy the heat. For ordinary farm labor and all teaming purposes, mules become more and more valuable as we go south of 40 degrees. As we

proceed north they become less and less serviceable, and few are found in use north of 45 degrees.

VII. Mules are not Vicious.

It is generally supposed that the mule is naturally vicious. This is a mistake. He is resentful and never forgets an injury; and if subjected to a long course of ill usage he at length becomes vicious. On the other hand, no animal is more susceptible to kindness, or will exert himself more strenuously for a kind master. Nevertheless, the mule must have a master, one firm and yet kind. The mule, as some of our readers probably know, has a most perfect means of offense and defense, namely, his heels.

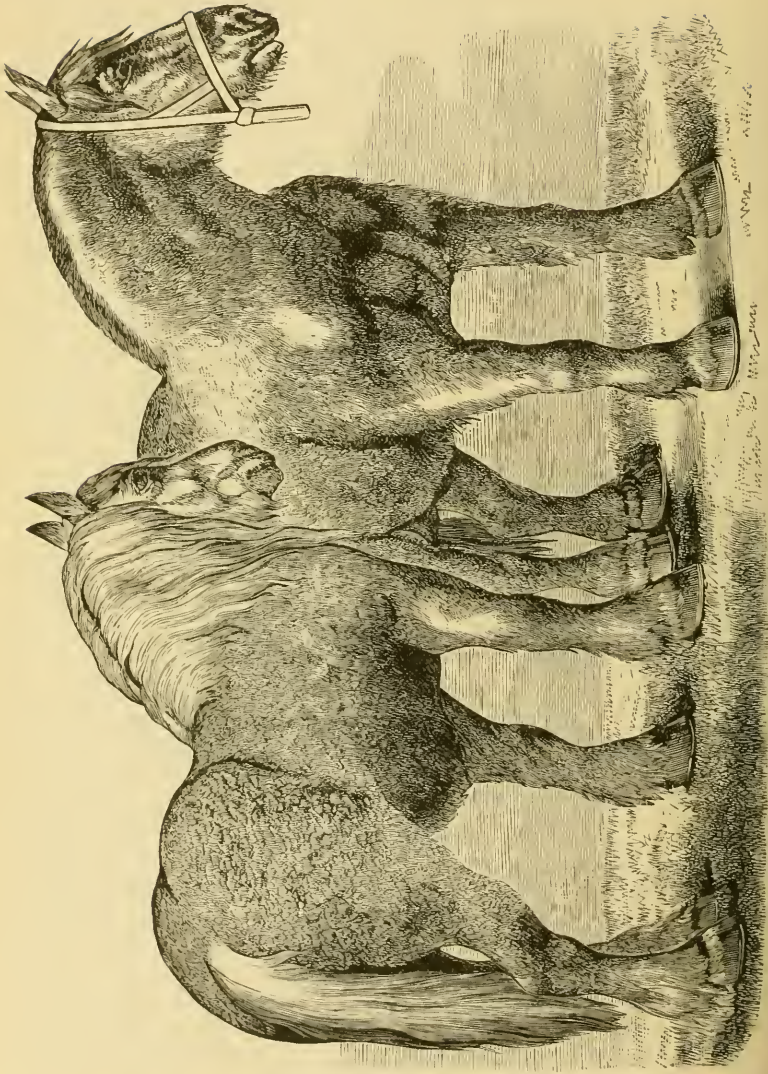


PERCHERON MARE AND MULE FOAL.

These he knows how to use to far better purpose than does the horse. They are not used, however, except under the impulse of fear or revenge. If kindly used the mule is at once amiable, tractable and willing to perform any due amount of labor. On the contrary, if ill used he becomes sullen, vicious and often balky in the extreme.

VIII. The Breeding of Mules.

In the breeding of mules, as of all other animals, attention must be paid to the use for which they are intended. If for packing in the mountains, small, compact mules, such as are bred from small, fine Spanish



OLD STYLE DERBYSHIRE CART HORSES.

jacks, are required. These are at once agile and sure-footed. For work on Southern plantations medium-sized mules are most sought. These are bred from mares of ordinary size, by good-sized jacks. In breeding mules for the road and for heavy teaming, large, roomy mares are used. These are served with the largest jacks, and at three years old command, when well matched, from $300 to $600 a span. The treatment of the mares and of the mule colts should be precisely like that described in the preceding chapter. The colts should be handled young, gently treated and made completely subordinate to the will of the master. At two years old

WINTERING IN THE WOODS.

they may be broken. They should be carefully harnessed, without frightening them, and hitched to a strong wagon, when they will generally move off without much difficulty. Thereafter they may do light work until they are four years old, when they may be put to full labor. Their dentition is similar to that of the horse, and the rule for telling their ages is identical with the advice for that animal. The illustration on page 163, shows a roomy Percheron mare and mule foal. Above is seen a group of mules as wintered in mild climates.

CHAPTER XI.

HOW TO TRAIN A HORSE.

I. THE OLD SYSTEM AND THE NEW.——II. THE AMERICAN WAY BETTER THAN THE ENGLISH.——III. DIFFERENCE BETWEEN BREAKING AND TRAINING.——IV. FIRST LESSONS.——V. LEARNING TO LEAD.——VI. TO MAKE A COLT COME TO YOU.——VII. LESSONS IN SOUND SIGNALS.——VIII. FLEXIONS.——IX. THE PROPER AGE FOR WORK.——X. HARNESSING AND DRIVING.——XI. THE AGE FOR REAL WORK.——XII. HOW TO SUBDUE A WILD COLT.——XIII. HANDLING A VICIOUS COLT.——XIV. SUBDUING A VICIOUS OR TRICKY HORSE.——XV. TRAINING A STALLION FOR SERVICE.——XVI. TRAINING FOR DRAFT.——XVII. HOW TO HAVE A GOOD PLOW TEAM.——XVIII. FORMING A GOOD SADDLE HORSE.——XIX. THE DIFFERENT GAITS.——XX. TRAINING TO TROT IN HARNESS.——XXI. FORMING A TROTTER.——XXII. TO TRAIN A RACER.——XXIII. SADDLING.——XXIV. HARNESSING.

I. The Old System and the New.

Under the old system of training, an animal was subdued by main force. What he learned was acquired under the impulse of fear. Under the new system, an animal is taught to depend upon and trust his master, by convincing him that he will not be injured. Under the old system, the whip and spur, and "terrible voice," were the means used to drive and force him up to, and beyond, an object that might be terrifying to a young and inexperienced horse, however harmless in itself. Under the new system, the young horse is allowed to see for himself that steam, harsh noises, great crowds, locomotives, the beating of drums, the thunder of cannon, and the various sights and sounds that, even to the savage and barbarian, would be terrible, are quite innocent, when the master's hand directs. Hence, the horse, trained to obedience and made familiar with the various sights he is to encounter, fears them as little, and is as eager to witness them, as a child. The habit of entire dependence upon the master prompts him to go forward, even into the most imminent danger, without other sign than that of eager curiosity or of obedience to the will of the rider or driver.

It is true that all this may be accomplished by the whip and spur, which are, even now, freely and needlessly used by some brutal teamsters, as well as by many really humane persons, who have never sought to understand the intelligence of the horse, and far less that of the other domestic animals under their care. Hence, to persons of this latter class, the horse is a slave, whereas, to the intelligent master, he is a servant anxious and eager to do his will. The element of fear cannot, of course, be entirely dispensed with in training. A wilful animal must be subdued at any cost of punishment; but this punishment should be as intelligently and humanely administered as in the case of a child. Those who train animals should first, themselves, learn to know what the animal means

by his mute language; in the case of the horse, for instance, they should know at a glance what is meant by the play of the ears, the arch of the neck, the expression of the eyes, and the attitude generally. These things once understood, more than half the difficulty of training is overcome.

II. The American Way Better than the English.

It has often been remarked that English horses are wilder, more dangerous and difficult to subdue, have stronger resisting powers, and are more liable at any time to exhibit freaks of temper, than American-bred horses. This is quite true, and for the reason that, in England, the old system of horse-breaking is more in vogue than in this country. In England, colts are not raised on every farm, as in the United States and Canada, to be the friends and the pets of the children. Their keepers are generally ignorant servants, who seem to think that horses have but two impulses—to eat and to injure. In America, colts are the pets of the boys of the family, and, while running with the mare, they become habituated to all the sights and noises of the farm. They never come to know their real strength as a resisting power against man; that power lies dormant, because on the farm, as a rule, they have no occasion to exercise it. We have accordingly insisted, as the result of experience, that the education of animals should begin at a very early age, when the power of resistance is small. For, if once an animal finds that the superior intelligence of the master is more than a match for brute force, kindness and careful lessons will thenceforth easily complete the education of all farm animals, and especially that of the young horse.

III. Difference Between Breaking and Training.

The difference between "breaking" and training must already be apparent to the reader. The aim of the first is to subdue, and force is promptly resorted to as the readiest means to this end. The comparatively-weak but intelligently directed brute-force of the master will, of course, generally win, and the animal, broken in spirit, becomes an automaton, performing through fear what he cannot avoid by resistance. In those cases where the superior force of the animal wins, he is thenceforward vicious and tricky, and passes from one master to another, until, worn out in the struggle, he either ruins himself or becomes the drudge of some reckless and brutal teamster.

Training, on the other hand, consists in teaching the young animal to know that, while the master must be obeyed promptly and implicitly, he is truly an indulgent master, requiring nothing but what is necessary to be done, and, once the task is performed, that the rewards of care and rest will follow.

No horse broken by main-strength and brute-force is quite safe for a woman to ride or drive, unless she be a complete horsewoman. The more wilful of them are never safe for any woman to drive. A horse carefully trained, however, is always safe for a woman to drive, if she be not especially nervous, and has accustomed herself to the guidance of horses; the only exceptions being such animals as by defective organizations are naturally vicious, cowardly, timid from imperfect sight, or tainted with insanity. These defects have already been mentioned in the chapter on breeding, under the head of heredity.

IV. First Lessons.

As before stated, the first lesson to be imparted is that of reliance on the will of the master. This lesson in obedience should be given at weaning time, or when the colt is first haltered to be stabled. If it has been haltered, as recommended, when quite young, there will be no resistance. If this has not been done, the colt must be driven into a confined space where it cannot escape. Take the halter in both hands, and keep holding it to the colt until it will touch it with the nose. Do not hurry. The important thing here is to show the animal that there is nothing dangerous about a halter. When the colt ceases to fear, place the halter on the head quickly, and fasten it. If it show no serious fear, tie it up at once. If it seems frightened, allow it to wear the halter a little time before tying up. When you fasten it, do so securely, for at some time or other it will try to break away. When this occurs, halter and strap should be strong enough to resist every effort. When it ceases to pull, it is thoroughly halter-wise, so far as standing quietly is concerned. It will have ceased forever to pull at the halter simply to free itself.

V. Learning To Lead.

The next lesson before the colt is learning to lead. You should have a small yard, into which you can take the colt. Provide yourself with a light switch, and also with a line about ten feet long, to be tied to the end of the halter. Let the colt play around in a circle, if it chooses, for a time. Approach him gently, take the halter by the nose-band with the left hand, while holding the switch in the right hand. If the colt rear, support yourself with the right hand, by grasping the top of the neck to keep the colt down. Use no undue violence. Do not strike it. When it gets through floundering, it will thereafter be quiet. Next take the halter in the right hand, and bid the colt go on. If it refuse, tap it under the belly with the switch, until it moves. If it rears again, again subdue it. So continue until it moves forward. Then talk to it, and pet it, and it will soon lead kindly, turning to the right or left at will

VI. To Make a Colt Come to You.

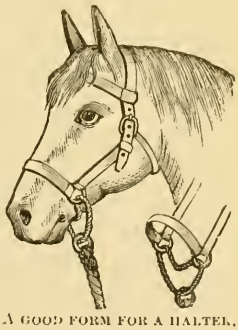
Have a long flexible whip. Place yourself just so far ahead of the colt that you can easily touch him in the flank, and then bid him "come here," at the same time pulling on the halter. If he will not come, tap him in the flank, or on the fore legs, and so continue until he obeys. If he pulls back, check him, and continue touching him until he comes up. Then pet him and give him a small taste of sugar, or something he likes. Continue in this way until he comes readily at the word. The colt will not always become perfect under the first or second lesson. Perseverance will accomplish each and every other lesson more easily than if violence were used.

VII. Lessons in Sound Signals.

We have shown that the first lessons are to accustom the colt to prompt obedience to the will of the trainer, as expressed by the voice or signals. The voice, however, must be the chief reliance. The signal by sound, should precede the signal by sign, or the check by the strap or rein; and should always precede the tap of the whip, when the whip is necessary.

A child is taught to speak through its power of imitation. If it never heard spoken language, it would never learn to articulate speech. So, the same word should always be used, to induce the performance by the colt of a certain act, as: Whoa! Back! Go on! Come here! When this has been accomplished, and the colt has been taught to stand at rest, to lead quietly or to circle about the tutor, at the end of the rein, he should next be taught to follow the master about the yard without leading, first with the halter strap in the hand, the tutor backing as the colt follows, and afterwards with the strap over the neck of the colt.

The preliminary lesson in backing may be taught, by taking the colt by the head, standing in front of him, and using the word "back," at the same time, pressing in the proper direction, and tapping it on the breast, if necessary. After a time the animal will back promptly and continuously at the word. This lesson, and all others of flexions, must be taught with the bridle and bit, since to back easily and properly, the head must be raised.



A GOOD FORM FOR A HALTER.

In all first lessons the form of the halter is important. We give that of a good one, which will not hurt the colt unless he pulls strongly on it. Upon ceasing, the halter will let up of itself. When once the animal is taught to stand quietly, an ordinary halter may be used.

VIII. Flexions.

That the colt may be able promptly to turn in any direction, what are called flexions should be practiced. The more simple of these are, raising the head high, putting it down close to the ground and then raising it, turning the head to the right or the left side, with the nose close to the body, but obliquely to it, etc. Full instruction in these flexions need not be perfected until the animal is two or three years old; and, in fact, but little of this exercise is actually necessary, except with the saddle horse. For saddle horses, flexions are especially important, since the object of them is to render the head, neck, body and limbs supple and capable of varied action. A curb-bit is necessary to their proper performance, and hence only preliminary and simple lessons should be given the colt, for the curb should not be used until the animal is nearly ready for work.

At the proper age, put on a bridle with a curb-bit, taking care that it fits properly in every part. Between the chain and jaw, the finger should slip easily, and the bit should just touch the upper part of the lips, and that only in the slightest manner. Stand in front of the horse, take the off or right rein with the right hand about six inches from the branch of the bit, and the near or left rein with the left hand, at about half the distance from the branch. Draw the right hand to the body, and press with the left, so as to turn the bit in the mouth. If the horse backs, follow him up, pressing steadily until he lowers his head, and flexes his jaw. Then slip the left hand along the rein until it is opposite the right hand and press the head to the breast, holding it curbed perpendicularly but obliquely to the right, until the horse will maintain the position himself.

Then flex the jaw to the left by a reverse action to that above given. Teach the horse to raise his head high and perpendicularly, by taking each rein, six inches from the branch, and raising, and pressing slightly back. Teach him to lower the head by a contrary action. Next teach him to sway the head to the right and to the left, to raise and lower the head alternately, by means that will readily suggest themselves. It will surprise you to find how soon the average horse will understand.

In all this, use no undue violence, and above all bear in mind that a curb-bit is a powerful lever, and must be carefully handled. When the animal is perfect in these flexions, take the reins in the left hand, near the branches of the bit; and standing close by and facing the shoulder, holding the head fairly up, and to you, induce the animal to move his hind feet, in a circle from you, the fore feet remaining stationary, as a pivot. This lesson perfect, make him stand firm behind, and move his fore parts from you in a circle. There are many other flexions taught in the menage; but the foregoing are sufficient for a saddle horse or light

driving horse; and these are not necessary unless the animal be intended for this kind of work, or for racing or trotting. Remember one thing, teach only one lesson at a time.

Again, let us repeat the caution, never to use undue violence, and never lose your temper, never speak loud, or jerk the reins, or act upon sudden impulse. Keep cool. Your object is to train, not break the will. When the animal understands the wish, and performs it, reward it with something it likes, and let it rest; a bit of carrot, or sugar for instance, goes a great way with a young horse.

IX. The Proper Age for Work.

The preliminary training may go forward from the time the colt is six months old, until the age of two years is reached. It will by this time be quite submissive to the will of the trainer, and without fear. A pad, with light stirrup-leathers attached, may be put on, and the colt be allowed to play about the yard with it, at the end of the rein. A well-fitting bridle may be put on, with keys attached to the center of the bit, with which the colt may amuse itself. When the colt is one year old and over, the crupper-strap may be put on, and the little animal may be reined loosely to the top of the pad. Later, the side reins may be put on, and the head gradually brought into position.

The colt, if stabled, should be regularly cleaned. His feet should be raised, and the hoofs lightly tapped with a hammer. He should be taught to lead, walk and trot, beside the trainer. Thus at the age of two years, if well-grown, he will be ready to be trained to light work, or, as it used to be put, "broken to harness."

Under the course of treatment we have laid down, he will have learned the use of the reins,—to go back, or forward, and to turn to the right or left at the word; and above all, he will have confidence in himself, and no fear of his master. In nine cases out of ten, if the colt has been taught to lead beside a well trained team, and used to the rattling of the wagon, he will go off pretty much like an old horse, except for his super-abundant life, the first time he is harnessed.

X. Harnessing and Driving.

Two years is the best age for putting the colt to light work. He has better teeth then than at three years old, and has arrived at the period when careful driving will assist to spread and develop the frame.

The colt will, of course, first have been taught to allow himself to be harnessed and unharnessed kindly. Put the harness on carefully and hitch him up beside a well-trained horse, usually on the off side, and start the team; then, if he plunge, he can do no mischief. Tie the double-tree of the old horse, so that he can pull all the load if necessary,

and bid them go. If the colt plunge and rear, keep the steady horse in motion, and talk to the colt. If he show too much temper, a few sharp cuts of the whip will bring him to terms, but in punishing him strike but once, and repeat if necessary. This discipline, administered with care, and driving to make them way-wise, is all the difficulty one need ever have with colts.

XI. The Age for Real Work.

Having performed light work, when from two to three years of age, let the colts have rest during the twelvemonth from three to four years of age. They are then shedding their principal teeth, and should be allowed to grow. At five years they may be put to real work, and they will then go on getting better and wiser, until they are eight years old, at which age a horse should be kind and without fear under any circumstances, and fit for any one to drive, who can hold the reins, and has judgment enough to keep from running against obstacles.

This may seem like a long course of training, and one accompanied by much trouble. It all, however, comes in the regular routine of farm life, and must be undertaken in one way or another, unless the animal be intended for mere drudgery.

XII. How to Subdue a Wild Colt.

The narrative of how the writer once subdued, and rendered perfectly amenable to the will, a pair of wild, high-bred four-year-old colts, that had never even been haltered, may prove interesting. The colts had been purchased from a person who was a capital and humane horseman, but believed in never handling a colt until four years old—and this is certainly better than imperfect handling. The two were driven together, into a close stall. From the outside of the stall, after many trials, in which no violence was used, but, on the contrary, soothing words, strong cavesson halters, such as are shown in the illustration, were put on the animals and buckled. A rope twenty-four feet long, and with a powerful snap hook in the middle, was attached to the ring of the halter, leaving the ends twelve feet. Two men were placed at each end of the rope, whose only duty was to keep it spread, and, so accommodate themselves to the movement of the colt, as to keep it as nearly within bounds as possible. Our horseman friend superintended one colt, myself the other. The colts were allowed to find their way each into separate yards. The men picked up the ends of the rope, and the struggle began.

The masters' part was simply to direct the movements of the men, and talk, each to his own colt. In ten minutes the rearing and plunging of one colt was over, and in less than fifteen minutes the struggles of the

other had ceased; in less than twenty minutes each of the colts, exhausted, allowed the hand of the master to be placed on the nose, and himself to be gently fondled.

Standing a short distance before the colt, with a flexible whip in hand and a cord attached to the ring of the halter, the men still holding the ends of the rope, but slack, I bade the colt come forward, tapping it on the knee after every word, with the end of the whip. The colt did not fear the master, only the assistants, and soon first one, and then the other, came forward promptly, and within an hour would follow like a dog.

They were led home and put in the stable. The next day they were bitted, and their training proceeded steadily. Within a week each of them was ridden, and in ten days they were harnessed together and driven. They were broken, during the season, to light driving under sharp curb-bits, accustomed to various odd sights, and having first been rendered submissive to the voice and will of the master, never showed fear that could not be quieted by a word.

XIII. Handling a Vicious Colt.

Some colts are naturally vicious. The head of such an animal is represented in one of the illustrations given with Chapter III. If you unfortunately have one, get him into a close stall, fasten him securely in, halter him and get him in the yard, using ropes to the halter-ring, not less than twenty feet at each end. After he has struggled and exhausted himself, proceed to make him lie down. This can be done in the following manner. Have ready a strong bridle with a snaffle-bit, and put it on him; also fasten around the refractory youngster a good padded surcingle, with a strap for the fore leg having a loop that will draw tight around the fetlock. Raise the leg, buckle the end of the strap securely around the arm, and you have him so he cannot kick. Fasten a longer strap with a similar loop, but no buckle, around the off fetlock; pass the end under the surcingle, taking the end in the right hand, while the left grasps the bridle by both reins; cast off the hampering ropes, and as the horse rears to free himself, pull tight the strap that has been passed under the surcingle, and when he comes down it will be on the knees. As he struggles, press his head from you, by pulling the off rein tight over his neck, and he will fall over on the side. When he gives up entirely, and lies still, the horse should be fondled, the straps taken off, and after a time, he should be allowed to rise. If not entirely subdued, the same thing must be gone over again.

This is essentially Mr. Rarey's plan. It need never be resorted to except under extraordinary circumstances, and the operator must have

been accustomed to handling horses, and understand the movements necessary in overcoming vicious and rearing animals.

Another plan is to hopple the horse and throw him down, but the one we have described is the best and most successful. It should never be attempted, however, except in a yard so thoroughly covered with some soft material that the animal will not hurt itself in falling.

XIV. Subduing a Vicious or Tricky Horse.

No person who is not well assured of his own power, should have anything to do with a vicious horse, especially if the animal be vicious from some physical infirmity, such as partial insanity, wicked temper, etc. If the horse has been made tricky by a previous timid owner, the case is not so bad. Go into the stable where he is tied, and speak to him in a firm voice. Put a strong snaffle bridle on him, take it by the bit, and order him to back. If he do not obey, strike him sharply with the whip on the fore limbs, holding him with the left hand, yourself partly facing to the rear, but so you can see every motion of the eye and ear. If he kick, cut him sharply with the whip (a rawhide is best) just above the hock, over the fleshy part of the leg. If he rear, cut him over the fore legs —never, however, giving more than one stroke at a time.

When he backs, take him into a small, close yard, and make him obey you, coming forward, backing, or standing, as you order. If he again show signs of temper, or unruliness, proceed to make him lie down, as before directed. But a horse that has been in the habit of having his own way with a previous master, is thereafter never safe for any one to drive, except him who has become his conqueror.

In making a horse lie down, never use undue violence. Once the straps are fastened, you have him completely in your power. Let him struggle; it will do him good. You have simply to watch, keep him from hurting you, and seize the proper moment for subduing him.

Once you have him down, and quiet, show him a buffalo robe, or any other object he dislikes; touch him with it, and let him touch it with his nose. When he at length smells at it, let him satisfy himself that it will not hurt him. At the first attempt at putting him down, if he get the advantage, let him rise and then try again. When, however, you have him in your power and quiet, soothe him: pass your hand repeatedly over his body; breathe in his nostrils; open his mouth; gently stroke his ears and nose, and let him taste of something he likes. Thus, by using judgment, knowing your own power and ability to manage an animal, the most vicious can be subdued to your will, if not to that of other drivers. But, once you undertake to subdue a horse, do not leave him until he gives up completely.

XV. Training a Stallion for Service.

For the reason that a stallion is stronger, more courageous, higher in nervous force, and more self-willed than the gelding, it is absolutely necessary that his actual training begin from the time he is a year old. He must be stabled, unless a pasture be provided where he may run every day. The ordinary training to halter, and in the flexions, learning to go forward, to back, to stand, to go kindly under the saddle and in harness, may be proceeded with much as in the case of any other colt. In addition to these exercises, he should be taught to circle at the end of the long bridle rein, to the right and to the left at the word of command, to describe the figure eight, to kneel, to sit on his haunches, and to rear and to come as suddenly down at the word of command. These lessons being acquired, he should be exercised in them frequently, and be also taught to come instantly to his master at the word, without bridle or halter-rein.

It will take time, all this, but henceforth he will not be found dragging his keeper about as though he were a toy attached to him. When the actual season of service is at hand, it will save many an accident, when in contact with unruly mares.

Sooner or later, there may come a time when the stallion will resist authority, and then there must be no hesitation. The whip must then be used sharply and strongly, to subdue him. If he comes at you with mouth open, strike him suddenly a stinging blow across the nose. If he rears, cut him across the fore legs. If he kick, strike across the hind legs, just under the stifle. The whip should be strong, long, flexible, of the best workmanship and loaded with lead at the handle. We have known its use, in striking a frantic brute behind the ears, to bring him down.

Remember what has been said about not striking more than once. Let there be a distinct interval between each sharp stroke, accompanied by as distinct a word of command. There is really little danger, to the cool horseman.

The horse and master should never lose temper at the same time. If so, the strongest brute-force will certainly conquer. After a stallion is once thoroughly trained, never trust him to any but a thoroughly competent groom, and one of calm courage. He is too valuable an animal to be either abused or spoiled. And during the season of service, never allow him to be ridden from one station to another. He should be led beside another horse, even when taking his daily exercise. This exercise should be thorough, out of the season of service, except for a period of rest of a month's duration immediately after the season. During the season,

the exercise must be sufficient to keep the muscular condition well up, and the digestive organs in perfect order. Thus only can you expect to have the most perfect colts as the produce of your sire.

XVI. Training for Draft.

A horse to be used safely for draft, requires less training than any other. He has but one thing to learn: viz: to exert his strength to the best advantage when occasion requires. To accomplish this, he should be daily exercised at a dead pull, being careful always not to overload, until he has acquired his maximum strength, which will not be until the age of eight or nine years is reached.

Training to the Wagon.—The wagon-horse should be trained to trot steadily with a light load, and to walk fast with a medium load. He must turn readily to the right and left, and describe short circles; he should also be taught to stop suddenly, by throwing himself in the breechings, so as to hold a wagon steady in going down hill, and last, but not least important, he should be taught to back all that he can draw forward.

XVII. How to Have a Good Plow Team.

A plow team should be thoroughly under control. The animals should be trained to the word, fully as much as to the rein, and taught to obey promptly the slightest signal. They must be evenly matched for strength and agility; for a fast, fresh horse, and a slow, dull one, together, are bad enough anywhere, but worst of all at the plow. With such a team, no plowman can do good work, and without good plowing we need not expect good crops. The team should be taught to move forward without crowding together or pulling apart; at the end of the furrow, the horse describing the least segment of the circle, should keep a little behind the other when coming about, so as to avoid being stepped on; and in the case of coming short-about, as in turning corners, he should make the turn by a series of short steps. To accomplish this, the team must be talked to, though few take the trouble to do it, and hence we seldom see a really perfect plow team, one that can accomplish their task with the least labor to themselves and their driver.

XVIII. Forming a Good Saddle Horse.

The forming of a saddle-horse, perfect in all his gaits, and amenable to the slightest sign of the bridle, voice, or heel of the rider, is more difficult than any other special training. It can only be done under a sharp curb-bit, and, to use this properly, the rider must have perfect command of himself in the saddle, and the lightest possible hand in using the reins. He must first become a horseman himself, before he can train a horse to the saddle. The animal should be perfectly flexed,

to render supple every portion of the body and limbs. He must be taught to go with head well-up and haunches well under him, to describe short circles and the figure eight, to turn, using the hind feet as a pivot, and also with the fore feet as a pivot; and he should know how to wheel suddenly without danger of unseating his rider. This latter is accomplished by a turn of the hind feet, the fore feet being in the air, and just after the impulse is partially given for the forward movement.

A saddle-horse should also be taught to change the leading foot, while in motion; and under whatever gait. The idea will be caught from the manner in which a person changes the leading foot in catching the step of another person. The horse's head is to be turned somewhat out of line by pressure on the bridle-rein, and also by pressure of the opposite foot of the rider. This will throw the head and croup out of the natural line of progression somewhat, as is done at starting, and then by a peculiar movement of the limbs their motion is changed. Thus, if the horse is leading with the right fore-leg, turn the head to the right, and, with the heel turn the croup to the left, and *vice versa*. Once learned, it is never forgotten.

XIX. The Different Gaits.

The natural gaits of the horse are walking, trotting and galloping. Walking is performed in 1-2-3-4 time, and in regular cadence. The ordinary trot and the jog trot are but modifications of the walk.

Galloping is performed in 1,2-3,4 time, and the faster the stride, the more nearly simultaneously are the fore feet and hind feet brought down, so that when the horse is running at speed, the movement is apparently in 1-2 time. Then the animal is extended to the utmost, with head and tail straight out. The gait is truly a succession of leaps, and soon exhausts the animal.

The slower the gallop, the less should the animal be extended, and the more should the head be raised and the haunches thrown under the body. Thus when an animal acquires the distressing, but fashionable, promenade canter, if he is handsome and has other corresponding accomplishments, he is almost priceless. The promenade canter is taught by reining the horse in to get his head well up, and then restraining him to the pace required. Thus the slower he goes, the more upright he holds himself. To teach this, the spur must be used, but with discretion.

The canter then is a slow gallop. The hand-gallop is faster and is an easy gait for the horse, since he goes at half speed and in a natural manner. The running gait is not distressing until the violent exertion begins to tell on the wind and bottom.

Besides these, and other artificial modifications of the gallop, the pace and its modifications, are the only other gaits which a horse may be taught; for leaping, wheeling, rearing and springing forward or from side to side, are all forms of the gallop. The amble is sometimes classed as a modified pace. It is, in reality, a slow gallop, easy and smooth, and, like any other saddle gait, must be taught under the curb.

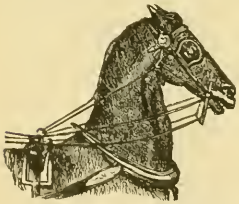
The true pacing horse lifts the fore and hind feet simultaneously on a side, first on one side and then the other. Like running at speed, it is performed in 1-2 time. The rack is a modified pace. Instead of two feet being lifted simultaneously on the one side and then the other, the feet are lifted in 1-2,3-4 time, but not regularly as in the walk.

Single-foot, again, is a trained rack. Some horses take to it easily, and in fact almost naturally, just as some horses take to pacing naturally. But it often takes time to instruct the horse therein, though once acquired, it is not soon forgotten.

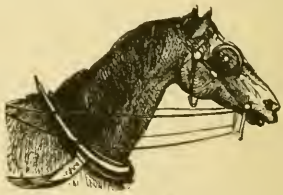
No written instructions can be given for adapting all these gaits, except such general rules as are laid down for rendering the animal amenable to training. Once, by practice, you have imparted the gait, be sure to give the animal a kind word, and a rewarding caress.

XX. Training to Trot in Harness.

If a horse have the trotting instinct, all that is necessary in order to develop it is perseverance and training. The head should be carried tolerably high, but not unnaturally so. The conformation of the horse must be studied, (see Chapter IV), and to assist the reader further, two cuts are given, one showing a horse's head, strained unnaturally and unduly



AN ANNATURAL POSITION.



HEAD CARRIED NATURALLY.

by the bearing rein, the other showing the head drawn up naturally with the bit. In the one case the head is strained up by both check rein and curb, while in the other it is simply held in proper position by the curb.

There is no objection to the use of the check rein if it be not improperly used. It serves to keep the horse in shape under a slack rein, and from putting his head to the ground, when standing at rest

A matter in relation to driving in light harness, under the curb, may here be worth relating. We once trained a pair of fine roadster colts to

drive together in harness, solely under a pair of sharp curb-bits. This was thirty years ago. We were told that we could get no speed out of them, and that there would be danger of their falling. The last we knew to be nonsense, and the first we found to be a mistake. There were few teams that could out-foot them on the road; and, trotting at speed, they seemed to be going upon a slack rein. Not so, however; their mouths had never been calloused by the sawing of the "pulling bit," and they were amenable to the slightest sign. In fact, they were kept in perfect form, but it required delicate handling to do it. How much more elegant was this than the "g'lang" style adopted by too many persons when driving for pleasure on the road. Train, therefore, a pair of horses or a single light-driving horse, under the curb always, and, then, if you wish, you may drive them handsomely under the snaffle.

XXI. Forming a Trotter.

All that is required in a horse for trotting a race, is that he go fast enough. The training of trotters is a fine art, and one in which but few persons gain eminent success. Yet, a fair amount of the speed that is in a horse, may be gotten out of him, by strict attention to feed, water, grooming and proper work. He must be exercised every day to bring his muscles into proper condition for fast work, and at some period in each exercise, he must be made to trot as fast as he can, without breaking into a run. Thus his speed may be gradually increased, until at last he will forget the impulse to run, and if, in urging him strongly, he goes off his feet, he can readily be made to catch the stride again, by changing the bit; that is by pulling him a little out of line, as in making a horse change his leading foot. It is not necessary that you pull him hard to make him trot fast. The pull should only be hard enough to keep him steady and up to his gait.

The real work is done by long continued driving, and by lengthening his stride, by means of every persuasion possible. Do not expect to succeed the first or second year with a colt. A horse seldom comes to his full trotting power, until he is seven or eight years old, and often not until he is eleven or twelve. Hence, the large prices the fast ones bring.

XXII. To Train a Racer.

With running horses, as with saddle horses, it is necessary that they first be trained into perfect obedience; and the lessons in flexions must also be attended to, so that their limbs and bodies may be rendered supple. This part of the training having been thoroughly accomplished, all that is required is to keep them in perfect muscular condition, by proper feeding, grooming and exercise. They are then taught to increase their stride by daily speeding them, extending the trial from time to time until they

attain their best speed. This training should begin at two years old. At three, they should be given an extended stride, and they will reach their full powers at four, five or six years of age.

The training of colts to run fast races at two years old, is severely to be condemned, if the future usefulness of the animal is to be considered. Nevertheless, as long as it is found profitable by breeders and trainers, it will no doubt be practiced. The training of running horses, like the training of trotters, is a fine art. Yet the general principles, we have given, may be understood by all. A diet of oats and hay, the best of stable care, and daily work upon a proper course, under the eye of an intelligent master, are the things necessary to get the speed out of well bred horses; and no other than properly-bred animals should ever be trained for great speed. It is not in them.

The horse being in motion, the rider throws nearly all his weight in the stirrups, steadying himself with his knees and thighs. The rear of the body is thrown back and the loin arched, so as not to carry the weight too far forward. The trainer must know how to ride with the greatest ease to the horse, and to assist the movement by every means in his power; thus, the leg, from the knee, will be slightly thrown back, so that by stiffening the leg, the rider's center of weight may be easily changed, without his ceasing to bear firmly in the stirrups.

These directions are for riders or jockeys of medium weight. Lighter ones ride with longer stirrups, supporting themselves more by the thighs. The best race-riders scarcely, if at all, touch the seat of the saddle. This gives a good command of the horse, but is only used in race-riding, since it soon tires out the rider. The same position, however, will ease any horse in galloping over bad or rough ground, or any space that must be quickly ridden over.

XXIII. Saddling.

It will only be necessary to add some general directions to this chapter. In saddling a horse, for whatever purpose, do not use undue haste. Do not throw the saddle on, especially if the horse be young, or in the least inclined to nervousness. Go about the matter quietly and in a business-like way. See that the saddle fits. If it do not, make it fit. See that the girths are properly adjusted, and tightened, and that the crupper-strap, if there be one, is smooth and well fitting. The bridle must also be looked to; see that it is strong, properly put on, and of the right length from the head-piece to the bit. Before mounting, look again to the girths. They may need tightening another hole.

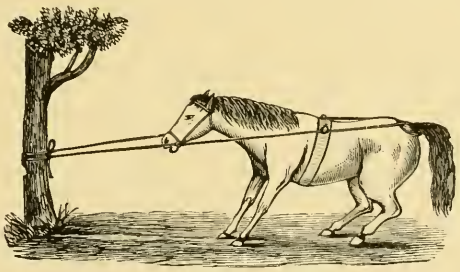
XXIV Harnessing.

In harnessing a horse it is also necessary that the gear be perfect in its fit, and not heavier than occasion requires. See that the back band does

not pinch, that the hames fit the collar, and that the collar fits the horse. For draft, especially, there should be room enough between the lower part of the collar and neck for the hand to be easily thrust between. If it is a breast collar, see that the draft-band is at the right place on the breast. For light work, a horse may have a closer-fitting collar than for heavy work, but whatever the work, the collar should be made to fit the horse, and not the horse to fit the collar. A horse may, indeed, work in a badly fitting harness. So may a man with an ill made tool. But in either case, it is at the cost of much discomfort, and loss of power; and, this is but another way of saying, a loss of money.

Pulling at the Halter.

When a horse acquires the habit of pulling on the halter, it is very difficult to break him. We have already stated the prevention; the first halter put on the colt should be strong enough to resist all attempts at breaking. The cure may be effected by the device shown in the cut.



DEVICE TO CURE THE HABIT OF PULLING.

A strong bitting harness and fastenings that cannot be broken are arranged so that, when the horse pulls back, the whole weight of the pull will come on the jaw. One effort will satisfy him of his inability to break loose, and the punishment will be such that he will not pull thereafter.

CHAPTER XII.

STABLES AND OTHER SHELTER.

I. THE ECONOMY OF COMFORT.——II. HOW TO BUILD STABLES.——III. WHERE TO KEEP HARNESS.——IV. TEMPERATURE AND VENTILATION.——V. THE ARRANGEMENT OF STALLS.——VI. CONSTRUCTION OF MANGERS AND RACKS.——VII. THE HAY AND STRAW LOFT.——VIII. AN ECONOMICAL GRANARY.——IX. THE WAGON AND CARRIAGE FLOOR.——X. THE HARNESS ROOM.——XI. THE STABLE-YARD AND OUT-SHEDS. XII. GRASS LOTS NEAR THE STABLE.——XIII. A GOOD SUPPLY OF WATER.——XIV. CLEANING THE STABLE.

I. The Economy of Comfort.

In building a stable, or other structure for housing animals, however rough it may be, the economy of comfort should be as carefully studied as though the building were intended for the family. Even the wealthiest do not always do this. Everything may be elegant and costly, and yet there is often less real comfort and economy, in the arrangement of their stables and barns, than is found in the poor man's buildings which, though rough, may, nevertheless, be arranged with an intelligent aptitude for making a place for everything needed and proper facilities, crude though they be, for doing the work and providing for the comfort of the occupants in the easiest but most thorough manner.

The selection of the site is of importance, since much depends upon this, when drainage and ventilation are considered. A commanding situation is generally selected for the dwelling house, and there is no reason why the next-best location should not be taken for the stable. The horse-stable should, if possible, be a building separate and distinct from the barn. In a suburban place, it need not be entirely hidden from the house. Neither, on the farm, is it proper that it be glaringly exposed to view, to save steps in the morning. In either case the stable may be somewhat hidden by planted trees, but not so much so as to cut off the free circulation of air. On the farm, if there is a chance for a bank-basement, breeding-cattle, requiring extra care, may occupy the basement; but never put horses there. Like birds, they require an abundance of air, but must not be exposed to drafts. The stable should be comfortably warm in winter and cool in summer. Attention to this point not only secures economy in feeding, and perfect health, but promotes that peculiar luster and softness of the hair, which all the grooming possible cannot give without it.

II. How to Build Stables.

The stable floor should not be less than sixteen feet wide. The walls should be at least eight feet high, though nine is better; and the horses

should stand in a single row, when but few are kept. The heads of the animals should be toward the wall, so that the ventilators may admit air directly to them, and as near the top as possible. If more horses are kept than a single row will accommodate, in a barn of the size wished, they may stand in a double row, with sufficient space behind each row that they cannot kick each other. Thirty-four feet in width will be ample.

III. Where to Keep Harness.

For farm or draft horses, the harness may hang in the stable on pegs seven feet high, at the rear of each horse. But carriage harness, or other fine gear, should be hung in the harness room, out of the way of dust and the effluvia of the stable. The harness room is, indeed, the proper place for all harness, but few persons will take the trouble to carry it there, and it is, on the whole, economy to hang it as we have stated, especially when there is abundant light admitted to the stable of draft horses from proper windows, and the ventilation is perfect.

IV. Temperature and Ventilation.

The proper temperature for the stable is fifty degrees, ranging to sixty-five in summer, but never below forty in winter. The reason is obvious. The horse is especially sensitive to cold, and when the temperature is less than fifty degrees, the system becomes chilled. This may be obviated by clothing; and, here again, is one of the most important matters in stable management, both on the score of economy and of comfort, though it is one too generally neglected. The proper heat of the body must be kept up in some way. It is cheaper to do so by means of clothing, than by extra feeding. So, in summer, a thin sheet keeps the body cool, and is especially useful in protecting the animal, measurably, from flies.

Ventilation, again, is all-important, since by this means not only is the proper supply of fresh air constantly admitted, and without undue drafts, but it is also an important means of regulating the temperature, especially in winter. If the stable be made with hollow walls, the ventilation may come up through these. In any case, however, the air should be admitted as high up as possible.

A simple means of admitting air is by the use of sliding panels, which may be moved easily up and down, if hung with sash-weights, as in the case of windows. If the windows themselves are the ventilators, the same rule will apply.

Not the least important, in this connection, are the pipes for conveying the impure air up through the building and out at the roof. The main ventilating trunk should be not less than four feet square, beginning at

the center of the stable and leading to the peak of the roof. Funnel-shaped branches, opening behind each two or three horses, should connect with the main trunk. If the main ventilating trunk be provided with proper doors, it may serve to convey straw down from above for bedding, and also hay, if open mangers are used; and it may be remarked, in passing, that open mangers are altogether the best, to our way of thinking.

An excellent additional means of ventilation to supply cool air in summer and warm air in winter, is Mr. Wilkinson's plan of sub-earth ventilation. This consists, simply, in laying an eight or ten-inch tile tube at a depth of four to six feet under ground, and extending for 300 to 400 feet away, to an out-lot. The air coming from this pipe will always be cool, or about fifty degrees in winter, and seldom more than that in summer. If four funnel-shaped openings are provided at the upper end of the upright tube, it will always catch air from whatever direction the breeze comes. This means of ventilation is especially valuable in country dwellings, cellars and dairies.

V. The Arrangement of Stalls.

Large stalls are best, and each horse should have a separate stall. Whether built cheaply or elaborately, the stalls should vary in width from five feet, to five feet six inches, according to the size of the horse, and should be ten feet from front to rear. The partition-posts at the rear should be round, not less than five inches in diameter, with a gain cut on the inside, to admit the ends of the plank forming the sides of the stalls. The partition planks may lie between cleats. The posts may incline inward or not. If they do so incline, the bottom should be ten feet from the wall, and the top eight feet. The sides should be four and a half feet high, of two-inch plank, and if on the top of this there be placed a strip of strong woven-wire cloth, two feet higher, it will prevent ugly horses from biting or gnawing each other, and at the same time allow good-tempered ones to get their noses near together for companionship.

The floor should be double, and the upper one should be in three parts; that is, the first three feet in front, of hard-wood, two-inch plank should be laid close and nailed solid; the other two sections, of narrow, hard-wood plank are nailed on strong end-pieces, and with half-inch spaces between. These are to be hinged to other plank nine inches wide, next the sides of the stall, so as to shut together at the middle, to within half an inch of each other. Thus, all the liquid matter passes directly through to the solid and water-tight floor beneath, made of planed and grooved plank, and ending just inside the posts, in a narrow gutter, whence it is conveyed away to a tank.

Thus the animals are always clean, and the upper floor is readily raised for the daily washing it should receive. The solid dung and litter may be wheeled outside, or if there is a basement, throw it down through a trap door, to be made into compost.

If the expense of such a floor, as that described, is deemed too great, the floor may be made of hard-wood plank, or better, of smooth cobble stone laid in sand. Hard-rammed clay makes a most comfortable floor to stand on, if it be kept repaired, and straw enough is used for bedding to keep the animals clean. Plenty of straw must be used, whatever the floor, where the animal lies down.

The Economy of Bedding.—It is mistaken economy to stint the bedding. With a full bed, so that the animal may not only lie clean, but comfortably in other respects, there is no more straw soiled than with a thin bed. What remains clean can be used again. And, if it be an object, much of the soiled straw may be dried and used again. On farms where there is much straw wasted, it is incomprehensible that an animal should be scantily bedded. The soiled straw, contains the most valuable portion of the manure—the urine—and is a mine of wealth to a careful farmer.

VI. Construction of Mangers and Racks.

The construction of the manger should be such as to allow plenty of room for hay. It should be built from about eighteen inches above the floor, with a slat bottom or a tight bottom as preferred. It need not be more than two feet four inches wide at the top, by eighteen inches at the bottom, and about three feet four inches high. It should extend clear across the stall, the top rail being of sound, solid oak, with a feed-box two feet wide, for grain and cut feed, and as long as the manger is wide; sixteen inches will be depth enough, and if it slope to about eighteen inches at the bottom, so much the better.

On the other side may be an iron vessel that will hold a pail of water, and so arranged that it may be fastened in and removed at pleasure, for cleaning. An iron feed-box similarly arranged is better than one of wood, on the score of cleanliness. If there is to be a hay rack, the manger should not be omitted, and this should be larger at the top than at the bottom, and so arranged that the hay may be thrown in from the loft. The bars of the rack should be about six inches apart, and these also may be bought, of iron, if it can be afforded, and hung so as to open and fall back against the wall, for ease in putting in hay. The manger should have a substantial ring at the top, with not less than a two-inch opening, to tie to.

The manger may be built of yellow pine or oak, an inch and a half thick for the front, back and ends, and the bottom of two-inch plank,

unless it be made of iron and hinged at the back, to let down for cleaning, in which case a secure catch must be used in front. The top-front of the manger should be protected with two and a half inch iron bands, rounded at the edges, firmly screwed on, so as to project slightly over the top bar. They prevent the manger being gnawed and disfigured. It is also better that a post be placed from the ground to the under-side of the top bar of the manger, and midway from the sides of the stall. In this case a ring may be screwed by the shank, or stapled into the post, in such a way that it may play freely. The tie may have a light weight at the end, so that the bight of the halter will be in no danger of getting under the fore legs of the horse.

VII. The Hay and Straw Loft.

Every stable should have a loft for hay and for straw, with chutes, or tubes, for easily throwing it below. The chute for straw may be the tube used for ventilation and, of course, must have a tightly-fitting door to prevent effluvia from entering the hay loft. The ventilating tube may be used for hay, even if the hay has to be carried from the floor to the manger, but it is better that the hay-chute connect directly with the manger. If a rack is used, the chute should connect therewith.

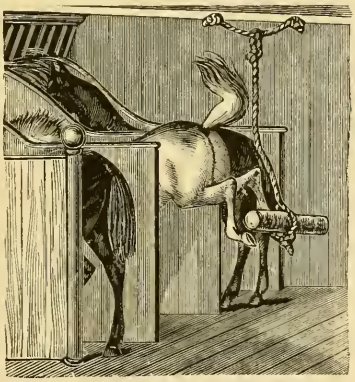
The floor of the loft should be of tightly-fitting, planed and grooved flooring, to prevent the sifting of seeds and dirt below, and especially to keep the effluvia of the stable from rising into the loft.

VIII. An Economical Granary.

The granary of the stable should be in the loft or floor above the stable. This should be a tight room, rat proof, with bins for oats, bran and cut-feed, with chutes from each running to a feed room below, each bin being provided with a proper slide, for giving out or shutting off the grain. The bottom of the bins are better if funnel-shaped, so that the entire contents will run out when necessary. The chutes for grain should be four inches inside. There should also be a room for cut hay and straw, each with its chute, these being not less than twelve inches in diameter, though fifteen is better. Thus it will always be easy to get either cut hay or grain, and it is certainly easier to put the supply at once where it is safe and easily come at, than to take many steps each time you want feed. Besides, it saves grain.

Below them should be a suitable trough for mixing feed, and also a sieve, with a mesh small enough to save any feed grain, for winnowing and cleaning the grain before feeding. The regular feeding of absolutely clean grain has often saved the stable-man the care of serious disorders in his horses.

The cut of stalls we give, and those we have described, are the very best that can be made. It does not follow, however, that they must be made in a costly manner, as written. The good sense of any intelligent farmer may so modify them, that while they are strong, a large outlay need not be made, and yet the principles of utility may be retained. It is the same here as with building. The cheap structure, if strong and economical in the design, may be fully as safe and comfortable as the most expensive. A thing well done is economically done. Illy done it causes waste and loss. If you have no lumber, poles and puncheons, carefully smoothed, answer every purpose. If you are not an adept at framing and must do your own work, strong stakes set in a pretty deep trench, or driven solid, and quite close together, evened at the top, and a cross-piece nailed securely on the top will serve as a manger. The rack may be made of two poles, bored half through with a two inch auger at



A DEVICE TO CURE THE HABIT OF KICKING.

the bottom, and clear through the top piece, with an inch and a half auger, to receive the slats, which may be straight saplings, properly shaved. So, the rear posts may be young trees, six inches in diameter, properly dressed. Thus any inside fixture may be easily arranged, and at light cost by any one ordinarily handy with axe, saw, drawing knife and hammer, as every farmer should be. The device for kicking horses shown, is the one in common use. It is illustrated to show how faulty it is. A far more sensible plan for a kicking horse, if you are so unfortunate as to have one, is to replace the log with a good compact bunch of osage orange brush. This will punish without injuring the horse.

IX. The Wagon and Carriage Floor.

It is good economy to have ample space in the horse-barn in which to keep the carriage, buggy and other more costly vehicles. No one should own a vehicle for pleasure, or even a spring wagon, without proper means of sheltering; and it is needless to say that fowls, pigeons or other birds, are never to be allowed inside the horse-stable and carriage house.

The ordinary farm wagons may be kept under a proper shed, when not in use. If the habit were formed of putting every vehicle in its place, even if to be used again soon, it would be found not to take any more time than to have them left wherever the driver may think proper. In nine cases out of ten they are left just where they are in the way, or else they are exposed to the heat of the sun, or to sudden storms.

X. The Harness Room.

The harness room should be near the carriage floor, and easy of access from the stable, but separated from each by a tight partition. This room, besides containing pegs, or hooks for hanging each harness, should also contain a table for cleaning and oiling harness, and a cupboard for oil, blacking brushes, sponges, tools for mending harness, needles, thread, wax, a saddler's horse, pieces of leather, buckles, etc.

XI. The Stable Yard and Out-Sheds.

The stable yard should be dry and firm, and large enough to properly exercise and train an animal in. It should be protected on every side by a tight fence six feet high. On one side, but not facing in the yard, will be found a good place for the wagon shed. Along one side, and opening into the yard, may be a shed containing feeding troughs at the wall. It will be useful for many purposes.

XII. Grass-Lots Near the Stable.

At least one grass-lot should be near the stable, and, if large enough to be divided into pasture and meadow, so much the better. The pasture will often be wanted to turn a lame or partially disabled animal into, and it is also a good place for the colts to have a run. If there is no spring or stream in the pasture a trough, under shelter, must be provided, and this may be connected with the house-pump by an underground pipe.

XIII. A Good Supply of Water.

It is essential that a constant supply of fresh water be had at the stable. The best stable buildings are provided with a windmill at the top, and a tank in the loft, to secure the needed water from the nearest well or stream. The tank should be closed tight and should be provided with

a waste pipe at the top. Another pipe, from the bottom, leads to the stable, with a branch to the place where the carriages are washed. A hose will thus enable you to wash vehicles thoroughly and easily. The windmill and tank may be placed anywhere on an elevation, from which the water may be carried by underground pipes to the stable or to any other part of the premises where it may be wanted.

XIV. Cleaning the Stable.

This should always be done at the proper time, twice a day regularly, and oftener if waste matter accumulates. A splint broom will easily sweep away the accumulations of manure, that gather from time to time during the day, and the satisfaction of seeing everything neat and clean will more than compensate for this light extra labor. A stableman should always be held to account for any neglect of this duty.

The tools necessary in a stable are two good manure-forks, a hay-fork, brooms, a scraper for pulling away manure, strong pails, sponges, brushes, curry-combs, a card-comb, scrapers for taking the sweat from the body, and plenty of cloths for rubbing the body and limbs of the horses. There should be also provided a thin sheet for every horse in summer, and warm blankets for winter. There should be a full set of tools for cleaning the animals for every two, or at most three, horses kept in the stable.

CHAPTER XIII.

FEEDING, WATERING AND GROOMING.

I. THE GOOD THAT A SIEVE WILL DO.——II. HOW TO FEED.——III. WHEN TO FEED.——IV. WHAT TO FEED.——V. CONDIMENTS.——VI. HOW TO MAKE MASHES.——VII. HOW TO MAKE GRUEL.——VIII. THE QUANTITY OF GRAIN TO FEED.——IX. HAY AND STRAW.——X. GROOMING.——XI. WHEN TO GROOM.——XII. GENERAL STABLE CARE.——XIII. BLANKETS AND OTHER CLOTHING.

I. The Good that a Sieve Will Do.

There is, of course, such a thing as being too methodical, but more failures result from want of proper attention to the little things that go to make up the whole, than from too minute an attention to details. A competent knowledge of the requirements in every case, combined with accurate judgment to carry each one out according to its relation to the whole, is what marks a man of sensible, methodical habits, by contrast with one who works at random, or neglects some detail that may be of the first importance.

How few farmers, for instance, think it necessary to have a sieve for cleaning the grain which is fed to horses! And yet, this is one of the most important of the minor implements of the stable. The use of a sieve saves cleaning the dirt from the feeding boxes; saves horses the annoyance of swallowing bits of wire and other trash, quite common in these days of automatic binders; saves the teeth of the animals from being broken on gravel, or other hard substances in the grain, and gives one the satisfaction of knowing that the horse is enjoying a meal, clean and wholesome as that of his master. Many careful men wash the grain after it is cleaned from trash in the sieve; which is a most sensible operation, and an easy one, since you have only to drop the sieve partly in water and shake it, or pour a bucket of water over it and let it drain.

II. How to Feed.

A horse must be fed with reference to what he is to do. The horse doing slow but hard and exhausting labor, should have all the clean, sound grain he will eat three times a day, with as much clean, sweet hay at night as he will consume, though we seldom find hay so fine and good that all will be eaten. The grain, during the heat of summer, should be oats, in cooler weather oats and corn, while in winter the corn may constitute fully half the ration.

If cut feed be used, half oats and half corn, ground together, may be used, and this mixed with one-third its bulk, not weight, of bran. When the animals are fed whole grain, this mess should be given two or three times a week, at evening, as a change.

The ordinary farm-horse should be given as much oats as he will eat three times a day, in summer, and be allowed grass or hay at night, in their proper season. When not at work, on Sundays, they are sometimes put upon pasture, and we have known farmers turn out their horses at night to feed. This plan we dislike. The farm-horse has exhausting labor, and should rest in the stable when not at work. The grass at night is good; let the farm-horse have it by all means, but cut and carry it to him.

Horses kept for driving, light pleasure horses, and the business-man's horse, should be fed on sound oats and hay, with a sweet mash of bran once or twice a week. Many persons of this class, turn their horses out to pasture during the summer. Nothing could be more injurious. The animals are eaten up by flies and mosquitos; they get out of condition, and the owner blames the person who has grazed them at so much a week. If they are turned out at night and sheltered during the day, and get half rations of oats, it is not so bad.

The proper time for a horse to have a run at grass is in May and early in June; but the animal should have a little oats daily. A month at grass is amply sufficient.

The full feed for driving horses is from four to six quarts of oats, three times a day, according to size, and as much sound hay as they will eat. Musty grain, musty or dusty oats, gives rise to heaves and other disorders, and should never be fed to any horse. Hence, in using ground feed, be sure that it is made from sound grain. Washing and kiln-drying does not cure musty grain, though it may deceive the unwary. Hence, again, the best plan with all driving horses, and horses for other fast work, is to feed whole grain to them.

III. When to Feed.

A horse should get his feed as regularly as a man. His stomach, like that of a man, is small, and the size has been reduced by artificial breeding and care. Horses doing fast and exhausting work, should be fed grain four times a day; at six and at ten o'clock in the morning, at two in the afternoon and again at night. Carriage horses should also be fed four times a day; but the morning feed need not be until seven or eight o'clock, since the animals are not required to be used, as a rule, before ten. They should be fed again at lunch-time, or as near twelve as possible; also before going out in the afternoon, and again upon their return in the evening; if they bring the family home late, they should also have a feed before being left for the night.

Trotting horses and racing horses should be fed with grain four times a day, and light-feeding animals should have every inducement held out

to get them to eat enough. It is seldom that animals of this kind are too greedy. Their feeding is so regular and their care is so good, that they are seldom inclined to overload their stomachs. If an animal be a glutton he must be restrained to such a quantity of food as will support the labor he is to perform. No horse driven at fast, or to exhaustive work, should be taken out in less than an hour and a half, or two hours after finishing the meal; and it is better for any horse if he have an hour of rest after eating, before returning to work.

IV. What to Feed.

What the feed of horses should be, has been partly stated in the preceding sections. It may be varied somewhat, according to the price of grain. As a rule much cut feed is given to teaming horses, express and dray horses, in cities, especially in large stables, where the a methodical system is followed, and intelligent foremen have charge of the different departments. If corn is given as a substitute, in part, for oats, bran should be used with it. Cut feed at night, with oats morning and noon, makes excellent provender for any draft team, including those for farm work. On a number of farms where many horses are used, this is the rule, and a most excellent one it is, during the season of hard labor. In winter, more corn may be fed than oats; and when corn-meal and bran are used, a heaping measure of bran to a stricken measure of meal, is a good proportion.

The intelligent reader will be able to judge, from the suggestions here given, how to regulate the messes. A horse, regularly and fully fed, will seldom eat too much. Now and then it will be necessary to restrain a greedy one. If a horse is given to bolting his grain whole, he should have chopped food, or it must be so managed that he can only pick it up little by little. It is the half-fed horse that founders himself when he gets at the grain bin.

V. Condiments.

It is well to avoid horse condiments, condition powders, and nostrums warranted to cure. On the farm they should not be needed; and if the animal is really ill, the proper treatment of the case will be found further on, in the chapters devoted to diseases. In the cities and larger villages, the advice of a competent veterinary surgeon can now-a-days generally be procured. Arsenic, strychnine and other violent drugs, especially the first named, are much in vogue to give an animal fire and a sleek coat, especially by ignorant persons who pretend to know all about horses. They are ruinous unless used as prescribed by a competent veterinarian. If a horse lacks appetite, rest and a few bran-mashes will generally remedy the trouble. Condition powders are beneficial, if the system is out of

order. Their use, and how to prepare them, will be given in the chapters on the treatment of diseases. Salt is the only true condiment for herbiverous animals. This they should have always before them. They will then take just what is needed and no more.

VI. How to Make Mashes.

A sweet mash is made by taking four quarts of good bran, moistening it gradually with hot water, and then adding enough boiling water to bring it to the proper consistency. Cover with a cloth, and when cool enough give it to the horse. A small teaspoonful of salt may be added, if desired.

Another good mash is made by boiling two quarts of ground oats, a pint of flax-seed and a little salt, for three hours. Then mix with it enough bran to bring it to a proper consistency for eating. A half pint of molasses may be added to the water. Cover with a cloth and feed cold. This is the quantity for a horse, and is a good Sunday morning meal when the team is kept on dry food during the rest of the week.

VII. How to Make Gruel.

There is nothing better for a tired horse than gruel; every horse should be taught to drink it. Stir a pint or more of oat-meal gradually into four quarts of cold water. If you have no oatmeal, use half a pint or more, each, of fine corn-meal and flour, according as it is liked, thick or thin. Then fill up the pail, in which it is mixed, with water; stir and give it to the animal at once. Sometimes a dainty horse may be induced to take it, by first giving him a single swallow of water.

Never give a horse solid food when exhausted. If he will not take gruel, try him with hay tea, after having first turned down a quart of good stock ale. Rub him, in any event, until dry, and then give him his feed. By this time he will probably have taken some hay.

Hay Tea.—To make hay tea, fill a bucket with the best of hay, clean and bright. Pour over it enough boiling water to fill the pail. Cover closely to keep in the steam, pressing the hay down occasionally, or put it on the stove to keep it hot while pressing. In fifteen minutes it will be sufficiently steeped. Turn off the water into another bucket, and add enough cold water to make six or seven quarts, and give to the horse when cool enough to drink. It is nourishing and an excellent stimulant for a tired horse.

VIII. The Quantity of Grain to Feed.

Grain should always be fed by weight. If a team require a bushel of oats a day, this will be 36 pounds of sound, clean oats; if the oats are not clean, the bushel will weigh only 32 pounds, or less. If corn is to be substituted, give only a half bushel, or 28 pounds of shelled corn

to the team, at three feeds. If this is not enough, the allowance may be increased to thirty-six pounds. If the corn be on the ear, thirty-five pounds is the weight of the half bushel. In every case a half bushel of corn is the equivalent of each bushel of oats fed. In other words, the stable uses seventy pounds of ear corn, or fifty-six pounds of shelled corn, for every two bushels of oats discontinued. The change, however, should never be made suddenly, but gradually. Barley, rye and wheat are not injurious to the horse, but we must not feed more pounds than the regular ration of the grain previously fed. If ground feed is given, one-fifth less in weight will be required.

IX. Hay and Straw.

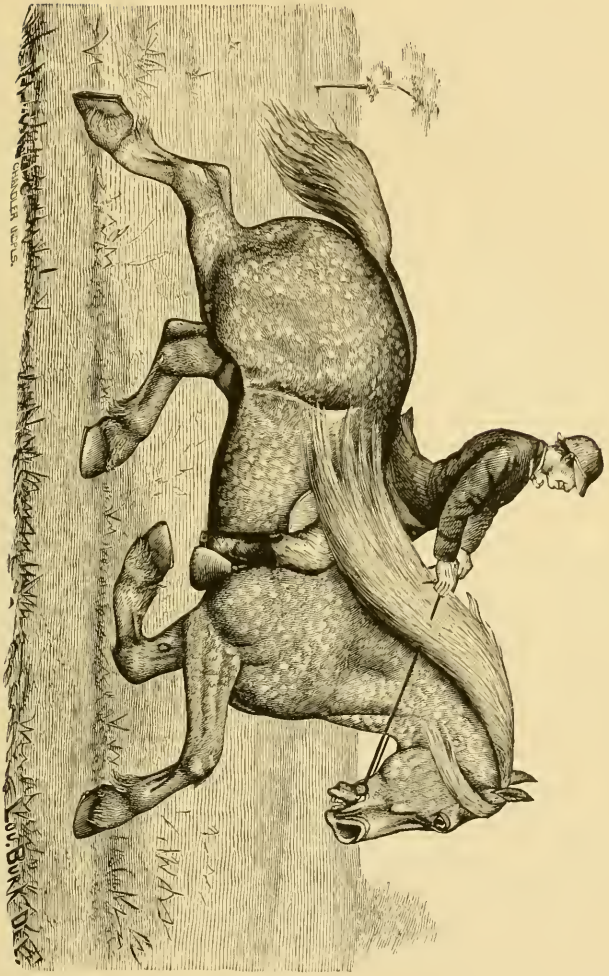
As before stated, none but sound hay should be used. Timothy, Blue grass, (*poa pratensis or poa compressa*), Fowl meadow, (*poa serotina*), Orchard grass, (*dactylis glomerata*), and Red Top, all make excellent hay. Clover should never be fed to horses; it is always dusty, and generally badly cured. Hungarian grass, if cut just when in blossom, may be given once a week; if fed constantly, or if too ripe, it acts strongly on the urinary organs.

Straw should always be used for bedding—oat-straw is the best; and a feed of sweet, clean, bright straw is relished occasionally by the horse. We once kept twenty pairs of farm mules all winter on bright straw and corn, with a feed once a week of Hungarian hay, and never had them come through better.

X. Grooming.

Stable tools are to be used, not abused; nor is the animal to be tortured with them. The groom who strikes a horse on the hocks, or other part of the body, with the curry-comb or other stable tool, should be discharged instantly. The groom who uses the curry-comb to the positive discomfort of a horse, or about the joints, should be admonished, and if he persist he should be discharged. The use of the curry-comb is simply to loosen the scurf and dirt, and to clean the brush. The curry-comb should be carried lightly and in circles over the body, and then a good bristle brush should be used to clean the horse. The brush should be used with firm, long strokes, and after every two or three strokes it should be drawn over the comb to free it of dust. Very short-haired and tender-skinned horses require little more than the brush, to be followed with a damp wisp of straw, finishing with cloths. The wisp and cloth should always be used to finish a horse.

If the legs are dirty and wet, they should be washed clean and rubbed dry; if they are dirty, clean them with the brush. Be particular about



THE NORMAN-PERCHERON HORSE IN ACTION.

the fetlocks, and the long hair of the lower limbs. They must be left both dry and clean.

The mane and tail should never be touched with anything except a coarse-toothed horn comb, and the brush. Brushes are made especially for this purpose.

The feet should always be looked to and cleaned when the horse comes into the stable. He may have picked up a nail, or graveled himself. Whatever injury of this kind he may have sustained should be promptly treated.

XI. When to Groom.

Every day, before going to work, the horse should be thoroughly cleaned. If he comes in dirty at night, he should certainly be cleaned before the master goes to bed. It is an open question among horsemen, whether a horse should be washed when dirty. Our plan is to scrape the body as dry as possible immediately, blanket in cold weather, bandage the legs to keep them warm, and clean when dry. The tired horse should never be placed in a draft of air to cool. If he do not cool kindly, he wants a stimulant, hay tea or gruel. If necessary, he may be walked about in the air; it will both dry and refresh him, unless he be badly used up.

XII. General Stable Care.

Of general stable care we have previously written. The animal should have done for him what he cannot do for himself. It is poor economy to be without any necessary article to properly care for the horse. The ordinary tools have been already indicated. Proper tools for cleaning the stable must be had, and proper implements for cleaning the horse are quite as necessary. The drinking bucket should never be used for washing the horse. When not in use, both drinking and washing buckets should be prevented from falling down. Keep them full of water, and change when necessary, but never mistake the wash bucket for the drinking bucket.

A wheel-barrow is a most useful thing in the stable, and its uses are also various about the place. The list of cleaning tools is a long one, but a horse may be cleaned in the most thorough manner with a good curry-comb, a brush, a wet sponge, a wisp of straw and rubbing cloths. A scraper should always be near for use upon sweaty horses. A section of a flat barrel-hoop will do very well at a pinch.

XIII. Blankets and Other Clothing.

The driving horse should have a summer and a winter stable-blanket, and a summer and winter blanket for the street: also a hood for the head and neck, and other appliances for protecting the limbs, as bandages, etc.

The farm horse requires only a summer and a winter blanket, and a hooded sheet, or good fly net, when driven in summer. Each horse should have his own blanket, plainly marked. If you have them, you will of course use them when necessary. A blanket is of but little use without a surcingle. See that the surcingle is properly buckled, and protected, so it will not hurt the horse. Each blanket should have one or two breast straps and buckles, and a proper cord to pass across the buttocks, under the tail, to keep the blanket from moving to one side or the other. We repeat: proper horse clothing is among the most necessary and profitable investments for the stable.

CHAPTER XIV.

HUMANITY AND COMMON SENSE.

I. THE ECONOMY OF HUMANE TREATMENT.——II. COMMON SENSE IN ALL THINGS.——III. THRIFT AND UNTHRIFT CONTRASTED.——IV. CRUELTY AND IMPROVIDENCE VS. THRIFT AND KINDNESS.——V. WHY THE HORSE REQUIRES INTELLIGENT MANAGEMENT.——VI. HOW TO KNOW AN INTELLIGENT MASTER.——VII. PICTURES FROM REAL LIFE.——VIII. THE KIND MAN WILL HAVE A WILLING TEAM.——IX. THE "GOOD FELLOW'S" CRUELTY.——X. HOW TO USE ONE'S MEANS.

I. The Economy of Humane Treatment.

In the treatment of animals, humanity and common sense are one and the same thing. For, the humane treatment of these dumb creatures not only contributes to their comfort, but promotes their physical welfare, and enables the owner to get from them the largest amount of labor that they are capable of. The farm animals, and especially the horses, of a cruel, slovenly or miserly farmer are rarely in condition to perform the most efficient labor. A master, so unthrifty or penurious as to begrudge the proper care and feeding of his animals, is also apt to over-work and under-feed his laborers, and an employer who does this never has efficient help. His hired men, while at work, shirk every duty they can, and at the first opportunity they quit him; and the work that they cannot shirk is done in the most inefficient and slovenly manner. Even if inclined to do their duty they cannot work to the best advantage because the team is unfit. Here, then, we see two causes operating against the grudging or unthrifty farmer—inefficiency in his help and in his animals; whereas, the farmer who has common sense and humanity enough to keep his animals in good condition, has only one possible cause of inefficient labor to guard against, viz: inefficiency in the men he employs. A man of the latter kind, however, will have little difficulty in securing efficient help; whilst the grudging or unthrifty man seldom secures the best labor, because good men will not work for such a master, unless obliged to. Hence, the want of common sense or of humanity always reacts against the individual, and at a loss to himself. The horses of a good farmer are not pampered. His workmen do not expect to be; but the common-sense man will see to it that they are made as comfortable as circumstances will admit; that neither horses nor men are overworked; that the food, both for man and beast, is given in sufficient quantity, and that it is of good quality. Plain, but substantial food, well-cooked, should be provided for the men, and sound grain, plenty of water, careful grooming for the horses; and the eye of the master should also see to it that the animals are not abused by beating. If the horses have not been

broken in spirit, they will not need whipping; for the intelligent master will not long keep dull, lazy brutes, any more than he will employ lazy, shirking men.

II. Common Sense in all Things.

It would show as great a want of common sense to put a pair of colts, intended for fast road-horses, or trotters, or a young animal intended for a high-priced saddle-horse, to continuous and hard draft, as it would to expect extraordinary speed from an ill-bred brute, or from a horse bred solely for draft. Does not the same rule hold good in all transactions? Is it not the result of ignorance, or of a penny-wise and pound-foolish disposition that an inferior animal, of any kind, is ever allowed to be bred for any purpose? Whatever may be the labor that is to be performed, none but the most superior animals for the use, should ever be bred; just as none but the most perfect seed should ever be planted or sown. If the rule were universally adopted of breeding none but the best animals and sowing none but the best seed; and if, in addition, the proper care were observed in the breeding of animals and in the cultivation and saving of crops, the productions of the country might be doubled in three years, from the same acreage, while the average value of farm animals might be more than doubled in ten years. This is the direction of our thoughts when we urge the importance of common sense, intelligence and humane care upon the farm; their exercise brings the largest profit to the master at the lowest cost.

In 1879, which was a season of unusual productiveness, the average yield of wheat in the various states comprising the Union, ranged from 7 bushels per acre, in the case of North Carolina, to 20 3-10 bushels per acre in the case of Indiana. The average for the whole United States was less than 10 2-10 bushels per acre. Is the average farmer satisfied with ten bushels to the acre? Taking the country through, does it pay to raise wheat at such a rate of production? How many worthless acres must be sown to reduce the general average to ten bushels!

Again, the average price of horses for the whole United States in 1879 was $54.75 per head. Can any farmer expect to make money by raising and fitting a common horse for labor at less than $100? How many absolutely worthless brutes must have been sold for a song, to reduce the general average to half the price at which common work horses should be sold!

III. Thrift and Unthrift Contrasted.

In the one case we see a shiftless and at the same time cruel and perhaps drunken owner, with a miserable mule and a still more miserable, one-eared and one-eyed horse for a team. They would sell simply for

the price of their hides. Of course, they do not eat as much as an able team would eat, because they cannot get it. Scant feed is certainly not economy in their case, for the result of their day's work would be not more than an acre scratched over. So much for the unhappy team of a reckless master. This man and his family do not live. They simply

CRUELTY AND IMPROVIDENCE AND THEIR SURROUNDINGS.

exist, and their only mission in life seems to be to reduce the average price of live stock, and the average yield per acre.

Look at the other picture, if you wish to see a thrifty and able master with a handsome and able team, going off as though they meant business. There, also, are the happy children, just come out with the lunch basket;

there is nothing miserable here. The master is hard at work increasing the average yield of wheat, and by the exercise of humanity and common sense, raising the average price of farm stock.

IV. Cruelty and Improvidence vs. Thrift and Kindness.

The cruel or improvident man's team stands exposed to flies, or shivering in the street of the village, while the man is guzzling beer or whis-

KINDNESS AND COMMON SENSE EXEMPLIFIED.

key close by. They stand in their own filth at home, uncleaned, as they are half fed. The team of the kind and thrifty master stands in the stable at home, eating generous provender, when not at labor on the farm, or hauling heavy loads of produce to the market. The animals do not

lack blankets when necessary. They have no bony shoulders to be galled. They are not jerked about by the bits, nor are they lashed or beaten with a club while at work. They have simply been trained to obedience, and have been taught something of the English language.

In the streets of our large cities we can see plenty of such teams as we have described, teams both of the cruel and the provident master. On the average farm, we see none of the first kind. They are, happily, confined mainly to a rare class, shiftless, drunken squatters on waste land, though occasionally such masters are found, as renters, with their worthless brutes on the lands of a landlord too greedy to give an industrious laborer a fair rental for his labor. Do such landlords thrive? Unhappily yes. Sometimes, by denying themselves and families the common or decent necessaries of life, and by cheating even the poor knackers whose improvidence has thrown them in their way.

V. Why the Horse Requires Intelligent Management.

It is because horses are intelligent animals. They have a sense of reason, which may be improved by training. They are naturally disposed to rely upon their masters, and this disposition should never be overcome by the fear of injury. They are courageous, and at the same time timid. Their courage should be fostered, since it increases their spirit and decreases their timidity. They fear objects with which they are unfamiliar. Once they learn that an object is harmless, they cease to fear it. Thus they may be accustomed to the sound and sight of a locomotive, one of the most fearful objects to them naturally, and if allowed to satisfy themselves that a locomotive is not dangerous, they will at length want to touch it with the nose; for this is the last means a horse uses to fully satisfy himself that an object will not injure him. Thus satisfied, all further fear of that object is passed.

VI. How to Know an Intelligent Master.

An intelligent master, however poor he may be, will not drive a broken-down, rat-tailed, spavined team, with ears torn away, eyes knocked out, ill-kept and ill-fed. He will not have rusty tools, nor keep a hog-wallow by the side of his door. His wife will not be found pulling down and burning the remnants of a fence, for want of better firewood. His team, indeed, may not be in high flesh. The necessity of extraordinary labor, and plain food, may keep master and horse thin, but there will be intelligent care shown even in poverty. Cunning is not intelligence, neither is brute force power. The intelligent man, however unlearned, may be known by his surroundings, and by the care of his horse, if he is fortunate enough to own one.

All horse owners cannot have fine teams, but no man can afford to own a poor team. They must be kept in proper condition for labor, else the owner is losing money on them constantly. All farmers cannot have fine houses and barns, but no farmer should have either cold, or, in other ways, uncomfortable buildings. By studying chapter XII, one may easily learn how to make the cheapest structure comfortable. The

AN AVERAGE FARM TEAM.

illustration on this page fully illustrates an idea of comfort in farm animals. The horses are not specially fine, but they are in good flesh and well cared for. The master has no fear that they will run away. They are well trained and know they will not be abused, hence they drink contentedly, preparatory to the half-day's plowing expected of them. The barn is a rough structure, but it is well built and thoroughly warm in winter.

AN UNPROFITABLE METHOD OF FEEDING.

VII. Pictures from Real Life.

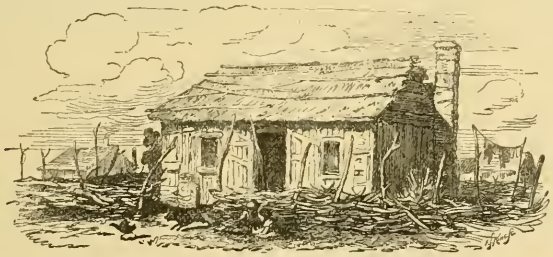
The surroundings of a man, in any condition in life, are an index to his character. The kind master may have only a stable built of poles, the sides filled in with hay, and the roof of the same material; but it will be comfortable. Health, thrift and care, in the end, will enable him

THE SHELTER OF THE PROVIDENT MAN.

AN IMPROVIDENT MAN'S BARN.

to build better. However poor, there will be method in his labor. He will sow no more crops than his team can properly prepare the ground for, and himself can carefully tend. His debts will not be for useless trumpery, and what tools he has will be in good order. His animals will be no more than can be properly cared for, so that, in the end, his barns and yards may look something like the picture of the shelter of the provident man.

The barn of the improvident man will be dilapidated. The door will be off the hinges, and propped up with rails. There may be some attempt at chinking up cracks. His wagon will stand anywhere in the storm, while his harness will lie handy, perhaps on the tongue of the wagon, or else be flung on the floor of the hovel he calls



AN UNTHRIFTY HOME.

a barn. His animals will be unsheltered, and allowed to shift for themselves at a neighboring hay stack, yet he will be so fully employed, that he will have no time to do better He will have no barn filled to the ridge-pole with fodder, no horses, cattle and sheep enjoying themselves

in the stables. His pigs can of course shift for themselves entirely. They will be so thin that they can easily slide through any fence near by, within which, indeed, all his stock have probably helped themselves, unless his careful neighbors have made their fences "horse-high, bull-proof and pig-tight."

As to his home, it may look something like the picture, airy in summer, but not comfortable in winter—for a brush-pile, eked out with bark torn from the fences, does not make generous fuel. Dear reader, have you not recognized the picture in your travels? Have not some of us seen the same thing near home?

The home of the intelligent and thrifty man will in time come to look like the one shown in the illustration of kindness and common sense exemplified. At all events, however humble, neatness and good care will be apparent everywhere.

VIII. The kind Man will have a Willing Team.

The team of the considerate man, if they unfortunately become chafed by the harness, when away from home, in a storm, are immediately attended to. They are kept warm, dry and clean; and however tired at

A Kind Man's Team.

A Cruel Man's Team.

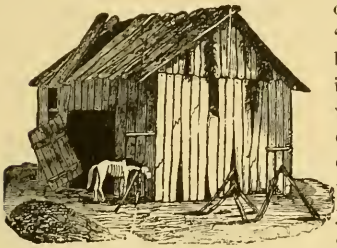
night, are always ready for work the next day, because they have rested in plenty of clean straw, with plenty to eat. If the master's means will permit, they will be lordly looking animals, not unlike the picture of a kind man's team.

At all events, they will not resemble a cruel man's team, with ribs showing like bean-poles, and themselves the pictures of hunger, gazing at an empty bucket,—or at least, a bucket empty except for the air it contains.

IX. The "Good Fellow's" Cruelty.

There is another class, known as good fellows, whose time is so taken up helping their friends, that they never have leisure to care for anything at home. They have time to hunt and fish, to play cards and drink. When they work, they work very hard, and are generally so used up, both man

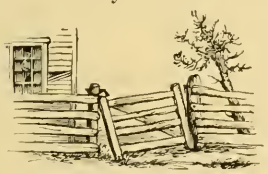
and team, that they require rest for several days. These "good fellows" often own but one horse, and borrow some other "good fellow's" horse to "splice a team." Their borrowings are extensive, and their more intelligent, because more careful, neighbors lend, for the sake of the poor family at home. Some people would call them lazy; perhaps this is as good a name for it as any other. They certainly do not work when they can avoid it. They do not think themselves cruel. Are they not? Yes, cruel in their neglect at home. The "good fellow's" surroundings may be shown in three pictures. First is seen his barn, if he has a barn, with his sorry old horse mournfully contemplating the chances for the coming winter. He has a house? Yes, we show a corner of it, and his door yard gate. He has, perhaps, a farm, or has hired a part of some richer good fellow's farm. Here is the other good fellow's field gate, and himself coming home after having had a good time. If too tipsy to open the gate, it will not be difficult to push it over.



A "GOOD FELLOW'S" BARN.

X. How to use One's Means.

This chapter may not, perhaps, be altogether practical, except in the sense of showing the impractical, and the folly of neglecting to use the means which any man may have. All cannot own fine teams; all cannot own strong teams, but every man who owns a team of any kind, should keep it in a condition for labor. The man who is improvident in the neglect of his farm and stock, is improvident in the underlying principle upon which all else rests. Hence, the pictorial story of thrift and unthrift may not come amiss; and the thrifty man who buys this book,



HIS DOOR-YARD GATE.

HIS FIELD-GATE.

may become an angel in disguise, if he will lend it to his unthrifty neighbor. It may be the means of mending his ways. The unthrifty man we have depicted seldom sees books—his family almost never, unless they be loaned to them. May-be it will teach the use of means at his command,

to improve his condition. If so, it will be a beneficent work that will give comfort to some animals, by improving their masters.

All bad masters, however, are not improvident, in the sense we have last shown; but whether improvident, niggardly, selfish, cruel or brutal, the amendment cannot but do good to themselves, their families, and to the dumb animals under their care. The improvement will put money in their pockets, because none of the vices arise from intelligence properly directed, though many of them proceed from perverted intelligence.

In preventing the growth and spread of vice, every man may increase the measure of intelligent endeavor. And intelligent endeavor is always the easiest road to success in any walk in life. And, again, the intelligent treatment of brutes is not the least of the human virtues.

CHAPTER XV.

HOW TO BUY AND SELL A HORSE.

I. ACCURATE KNOWLEDGE NECESSARY.——II. BUYING CHEAP HORSES.——III. A GUARANTEE OF SOUNDNESS.——IV. KNOW WHAT YOU BUY FOR.——V. THE PROPORTIONS OF THE HORSE.——VI. DESCRIPTION OF ECLIPSE.——VII. WHAT CONSTITUTES A GOOD HORSE.——VIII. MODELS FOR BUYING.——IX. THE RACING AND THE TROTTING FORM.——X. THE ROADSTER.——XI. SADDLE HORSES.——XII. A HORSE OF HIGH FORM.——XIII. BUYING FOR BLOOD.——XIV. CHOOSING THE BROOD MARE. XV. SELECTING THE STALLION.——XVI. HOW TO DETECT VICES AND DEFECTS.—— XVII. SOME FAULTS AND IMPERFECTIONS.——XVIII. WHAT IS UNSOUNDNESS ?—— XIX. BLEMISHES.

I. Accurate Knowledge Necessary.

The value of correct information in trading is no where greater than in buying a horse, with a view to his future use. There is so much to be guarded against in selecting an animal of good physical proportions for the labor intended ; so many vices, the result of bad breeding, or of abuse by previous owners ; so much unsoundness occasioned by hereditary transmission, by overwork, hard driving, or neglect ; so many defects which dishonest intelligence may cover up for the time being, that the purchaser must have been a close student and a keen observer to be able to guard against them all. In fact, no man can do so without a trial of the horse, in addition to the exercise of critical judgment.

In Chapters II, III, IV, and more especially in Chapter V, we have given illustrations and directions covering many important points. In the chapters relating to veterinary, others will be found. In this chapter, we shall go thoroughly over the ground not elsewhere covered.

II. Buying Cheap Horses.

The mania for buying cheap horses, or rather for getting an animal for much less than his actual value, is a weakness of such a large number of persons, that it is no wonder there are so many bad horses in the hands of farmers. Their means are often small, and, desiring to get as much as possible for their money, without being prepared to judge correctly the parts of an animal, they are often duped by designing men. And, having thus been taken in, the animal, as a rule, must indeed be a sorry one if the victim does not in turn practice the same deceit upon another. To avoid being swindled, it is a good and safe rule to distrust any horse that is offered for much less than his apparent value. An animal thus offered has generally been dishonestly come-by, has some unsoundness, is vicious in some way, or has some defect known to the seller and not represented. Hence, a guarantee should always be taken, unless the price paid is sufficiently low to cover all possible defects. Moreover,

never buy a horse of a man whom you do not know to be responsible, for unless the seller is a resident, and solvent, his guarantee is, of course, worthless.

III. A Guarantee of Soundness.

When a horse is bought on a guarantee, the article should be concise, and yet comprehensive. Unnecessary verbiage often causes litigation, and long forms are frequently written by scoundrels to deceive. A form like the following will cover the ground:

Received of Mr. , *Dollars for warranted years old, and under years, sound, free from vice, and quiet to ride or drive.*

Signature.

The place and date of purchase, the name of the person who pays, the amount paid, the description of the animal with pedigree, if any, and reference to the proper stud book, and the age, should be filled out and signed by the seller. Insert the names and the guarantee might read as follows:

Received, St. Louis, Mo., January 1, 1882, of James Cashman, Eight hundred and fifty (850) dollars for the dapple bay imported stallion Fearnought, black mane and tail, and two white hind fetlocks. Sire Stakeholder, dam Surprise, etc., *as contained in the stud book. Said stallion is warranted five years old, and under six years, sound, free from physical defect, and safe and quiet to ride or drive.*

(Signed) *Alexander A. Horseman.*

This form clearly covers the ground, and may be altered to suit any transaction in buying a horse.

A bill of sale may read as follows:

St. Louis, Mo., January 1, 1881.

For and in consideration of the sum of dollars, [or, if a note is given for the whole or part, state this fact.] *I have this day sold to James Cashman the horse*, etc., etc., [as in the other form.]

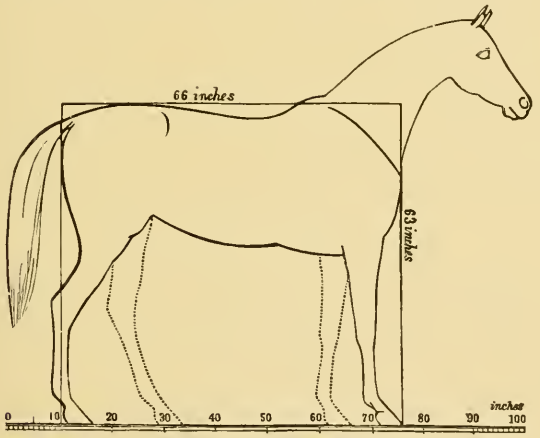
IV. Know What You Buy For.

The buyer must have a definite idea what he is buying for. If for work, the horse should be large, able, a good walker, and strong all over. See cuts of draft horses, and horses of all work. If for the carriage, he should have fine style and action. If for speed, this must be known. If for breeding, the particular use to which the offspring is to be put must be duly considered; if for breeding racing horses, the pedigree must be without a flaw; if for use where speed of any kind is desired, the pedigree should not be neglected; if for trotting, the pedigree should trace to trotting blood. And so of particular breeds, the genealogy of

the horse must be distinct, and the buyer must have accurate knowledge of pedigrees, or else must know that the seller is solvent and a man of his word. There must be no guess work or anything left to chance, in any animal bought for breeding a particular strain. For, once a mistake is made in breeding, the eradication, theoretically, can never be compassed. Practically, it will take a long time so to work out the false trait that the peculiarity will not be apt to appear again. On this point, the reader would do well to refer to what is said on Atavism and Heredity.

V. The Proportions of the Horse.

To assist in judging the horse, we give an outline indicating the proportion of the several parts. This, says Mr. J. H. Walsh (Stonehenge) one of the most graphic and correct of English authorities on the horse, combines the average of six horses selected for perfect symmetry, and taken, two of them from celebrated stallions, two from thoroughbred hunters, and two from chargers of great value. This, therefore, will not apply to draft horses, yet it will be found that the nearer the general utility horse comes to the measurements, the better he will be.



SCALE OF MEASUREMENTS.

	INCHES.
Height	63
Length from shoulder-point to quarter	66
From the lowest part of the chest to the ground	36
From the elbow-point to the ground	39
From the withers to the poll, just behind the ears, in a straight line	30
The same measured along the crest	32
Length of head	22

	Inches.
Width across the forehead	9 1-2
From the withers to the hip	22
From the stifle to the point of the hock, in the attitude shown in the plan	29
From the root of the tail to the stifle-joint	26
From the point of the hock to the ground	22 1-2
Length of arm from the elbow to the pisiform bone (the rear bone of those forming the upper articulation of the knee)	19 1-2
From the pisiform bone to the ground	19 1-2
Girth varies from	78 to 79
Circumference of fore-cannon bone (large metacarpal or shank bone, extending from the knee to the fetlock)	7 1-2, 8, 8, 8, 8 1-2 and 9
Circumference of arm just below the elbow	16 1-2 to 18

VI. Description of Eclipse.

That wonderful horse, Eclipse, differed essentially from this model. His head was of the average length in the six horses above, but was of extraordinary width across the eyes—said to have been twelve inches. He was very low before and yet was 66 inches in height. As Mr. Percival sums him up, "he was a big horse in every sense of the word; he was tall in stature, lengthy and capacious in body, and large in his limbs. For a big horse, his head was small, and partook of the Arabian character. His neck was unusually long. His shoulders were strong, sufficiently oblique, and though not remarkable for, not deficient in, depth. His chest was circular. He rose very little in his withers, being higher behind than before. His back was lengthy, and, over the loins, roached. His quarters were straight, square and extended. His limbs were lengthy and broad, and his joints large. In particular, his arms and thighs were long and muscular, and his knees and hocks broad and well-formed." As a weight-carrying, swift, long-distance racer it is not probable that his equal will soon again be seen. He was a phenomenon.

For racing, and especially for leaping, and for saddle horses, select the superior points of Eclipse, as many of them as you can find, leaving out the low withers. Except for draft, the horse that will come nearest to the points we have named, will be sure to give satisfaction.

VII. What Constitutes a Good Horse.

It is the ability to perform in the best manner the particular labor for which he is intended, that constitutes a good horse. Within the last fifty years, and especially within the last thirty years, particular attention has been paid to the breeding of animals especially adapted to draft, to the road, to use as fine carriage horses, and to trotting. The race horse, the saddle horse, and the hunting horse may be said to have attained about as high a degree of perfection as man is able to give them.

The fine roadster, the trotting horse and the horse for general utility, may yet be much improved. Within the last ten years the speed of the trotting horse has been greatly developed. In 1880, Maud S. made a mile in 2 : 10½, thus beating the record of 2 : 14 made by Goldsmith Maid in 1874, and in 1881 we saw her trot two heats in 2 : 11 and 2 : 11¾, the fastest two heats ever made.* We also saw Little Brown Jug pace a mile in 2 : 13. There are now a number of horses that can trot the mile in 2 : 15, and not a few that can do it inside of 2 : 20.

Where the limit of speed for trotters is, or how near they may yet come to the fastest running time, no one, of course, can tell. In buying a horse to breed colts for fast time, great attention must be paid not only to form, but to the pedigree as well. You may breed fast horses from those of good pedigree, though they do not themselves possess extraordinary speed. But you cannot breed fast horses from those which have no pedigree, however good their apparent form may be.

VIII. Models for Buying.

For reasons heretofore given, we have insisted that, to judge correctly the merits of a horse, one must have accurate knowledge—knowledge not only of what constitutes general excellence in horses, but minute and familiar knowledge of the qualities which fit them to perform in the best manner, the various services required. Knowing the great value of object lessons, we have not only presented numerous general forms, showing proportion, muscular development and anatomy, but have also given faithful representations of the more celebrated breeds. If you find an animal of the particular breed, conforming to the standard, do not fear to buy if you wish one from which to breed.

IX. The Racing and the Trotting Form.

As a model for study in racing form, the illustration we give is good. The illustration of the American thoroughbred in Chapter VII, may also be referred to in this connection. In Chapter VIII, some of the best trotting forms are shown, and explicit information about trotting horses is there given. The racing horse should be from 15½ to 16 hands high, muscular all over, short-backed, round-bodied, with long hips and deep and oblique shoulders; the head clean and the neck rangy and well set on. The limbs should be clean-cut, sound and firm in the bone,—not small and slender by any means,—and the eyes especially should be full, bright and clear, but mild, denoting, with the broad forehead, high courage and energy, combined with docility of temper.

X. The Roadster.

Roadsters must possess so many valuable qualities, good size, fine action, elegant carriage, high form, docility, and undoubted bottom, that

* Maud S. has since trotted a mile in 2 : 10¼.

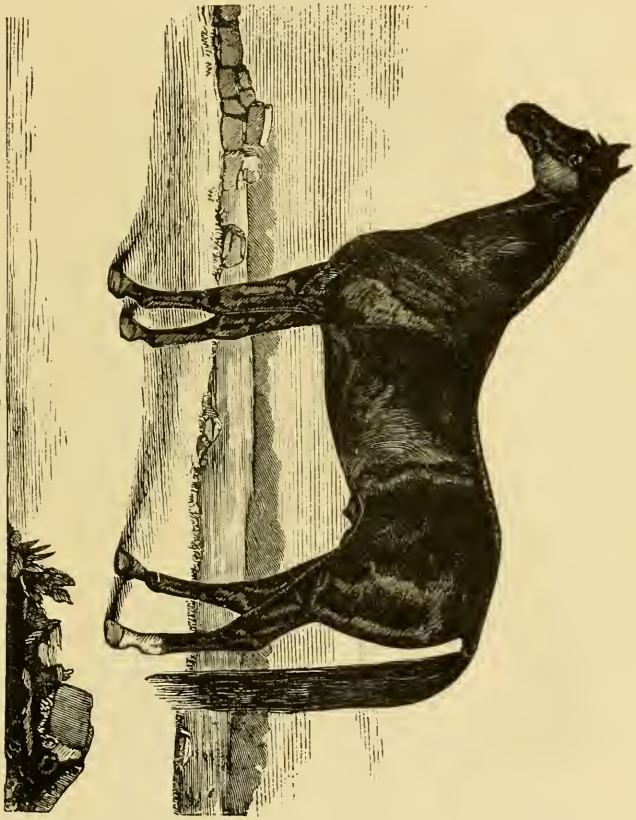
it is difficult to define their distinct points, *seriatim*. A sixteen-hand mare, handsome and fairly bred, generally brings first-class roadsters, when stinted to good trotting sires. If you are going to breed them, select

A Model Form for a Racer.

those that come nearest to the forms we give. If you are going to buy for use on the road, select the form to correspond to the models, and then insist upon a thorough and extended trial, and take a guarantee before you pay a high price for one or a pair.

XI. Saddle Horses.

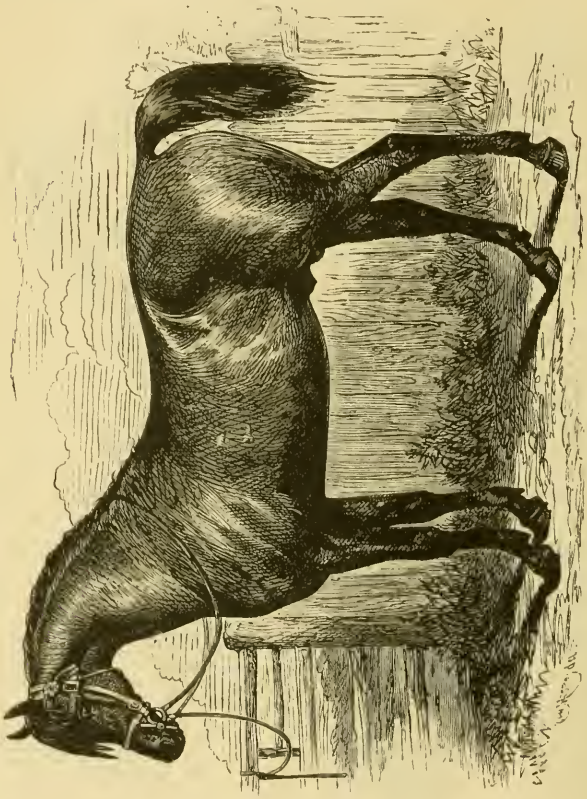
The saddle horse is the most difficult of all to get in perfection, except the fastest turf and trotting horses. They must be handsome, large enough to carry the weight easily, be perfectly trained; and then the



A Fine Roadster.

better the breeding, the more valuable they are. The illustration on the next page shows a good form for a model, if the horse is to be used both for driving and for the saddle—one that will perform well, look well and not easily tire. Such a horse will, upon mares of high style but rather light in the limb, and perhaps with the pasterns somewhat

too weak, get high-caste, easily-trained, flexible goers, that will sell anywhere. And those not of perfect form for the saddle will make good driving horses, or good horses for general utility; for it must be remembered, that, whatever the breed, only comparatively a few may be



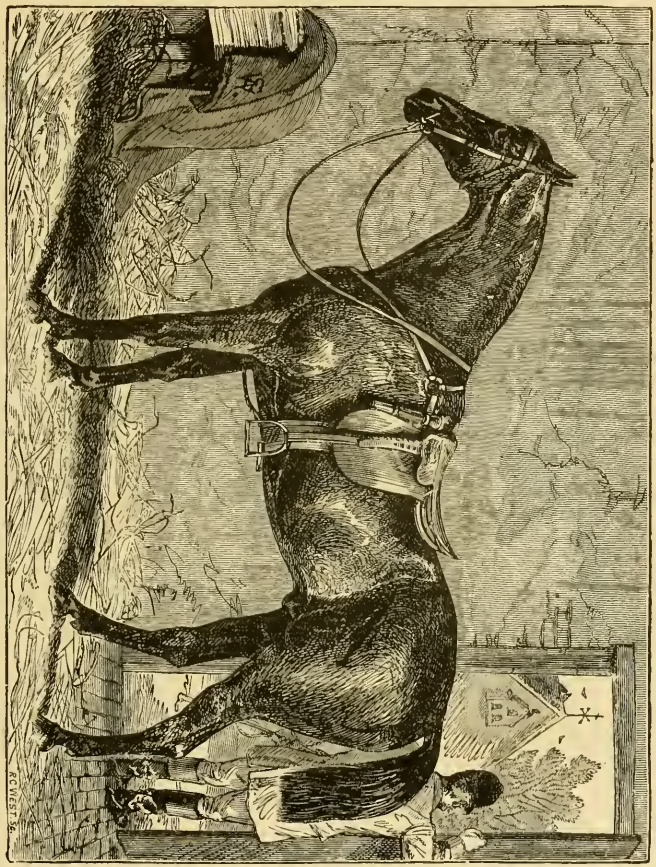
GOOD FORM OF A SADDLE-HORSE.

trained to a degree approaching perfection. But, the better the stock, the more perfect animals the breeder will secure.

XII. A Horse of High Form.

For fine action, high form, ability to carry weight and good performance, especially in the hunting field, a horse at least three-quarters

bred is to be preferred. The taste for hunting is largely indulged in in the South, and, as wealth increases, it will become more and more fashionable in the West. In fact, the demand for horses of high form and



A Horse of Good Form and Action.

breeding, for saddle use, is increasing in the West, and many Kentucky and Tennessee horses are bought for this purpose. It must be confessed, that as a rule they are not as good as they ought to be, many of

them ranging as under-sized. Colts from a "horse of good form and action," on proper mares, staunch, handsome and well-bred, will turn out to be the animals desired.

Such a horse will have a great stride, fine leaping powers, and the bottom to carry weight at high speed. It must be admitted, also, that such a stallion, when found, would cost a rather large sum of money; but the colts would sell correspondingly well.

Why should not every well-to-do farmer, who breeds horses, breed good ones, and for a particular purpose?

There is no reason why he should not have a well-trained and well-bred saddle horse to sell, when called for.

There is no finer country for training than the West and the South-west, and the training could easily go on during the use of the colt. If the reader has given close attention to the chapter on training, the ability to succeed will come with practice. But do not try to make a good saddle horse out of a "plug." It cannot be done!

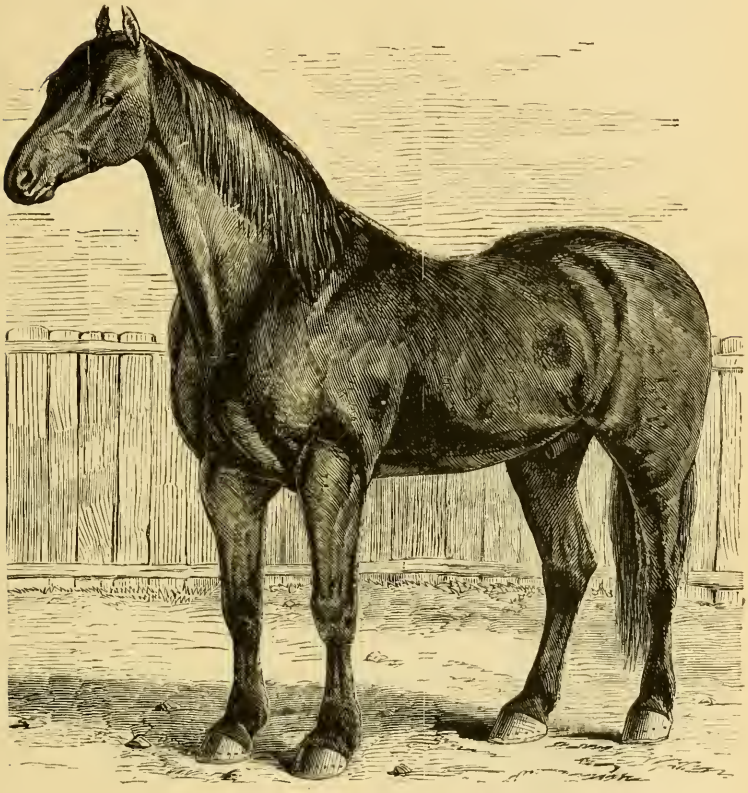
XIII. Buying for Blood.

A person who buys blooded horses with a view to breeding must not only understand the form and the various other qualities that go to make a good horse, as we have described them, but he must also understand pedigrees, or else depend upon some friend who does. There are about as many chances of raising a crack colt from the ordinary thoroughbred, even of unstained lineage, as there are of drawing a prize in a lottery. The sire and dam must not only be of perfect lineage, but the descent must be direct through a line of winning horses. Such sires are not numerous, and are in the hands of but few breeders. The well-to-do farmer cannot expect to compete with them, but he can secure blood that will improve his stock yearly, and give him many fine saddle-horses; and, those likely to fail as saddle nags will make handsome and fast-selling horses for general work on the road.

XIV. Choosing the Brood-Mare.

In buying a brood-mare the first thing to be considered is her blood; next her development; next her freedom from disability and disease, which latter is called soundness. Last, but not least, her temper must be carefully looked to. A fretful, ill-tempered mare is totally unfit to breed from; and yet, undoubtedly, a majority of farmers consider a mare good enough to breed from, even when worn out with work. A well-bred mare of this kind is certainly more fit than one of ill breeding and badly developed, or one balky from bad temper, or suffering from hereditary disease. A sensible breeder will reject all mares of this kind.

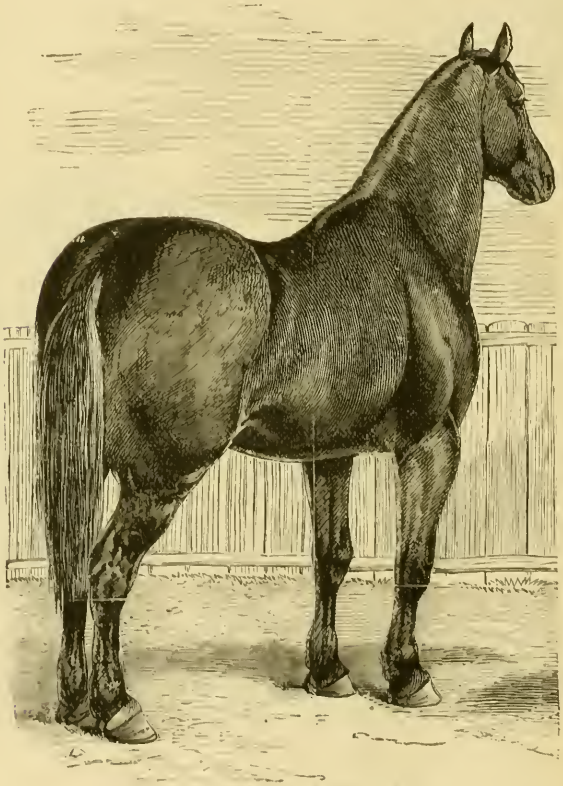
The Value of Partly-Bred Horses.—The real value of all draft, as well as speed, horses lies in their crosses and grades. When bred on roomy mares the half bloods make magnificent animals, losing, it is true,



HALF-BRED CLYDESDALE GELDING—FRONT VIEW.

much of the wonderful appearance of strength, as shown in the original breed, whatever it may be; but if they lose in this respect, they become finer, as the uncritical would view it—really so, when bred upon good blooded mares.

In the half-bred Clydesdales, as seen in the accompanying illustrations, the limbs are finer and much of the shaggy covering of the limbs is lost. The breadth of the forehead is well preserved, also the strong, handsomely supported neck, the fine shoulder and breast, the length of arm, the short leg below the knee, the strong fetlocks and hoofs, and the round-barreled, well-ribbed body and fine loin.



HALF-BRED CLYDESDALE—REAR VIEW.

In the rear view of the same gelding, is shown clearly the excellent eye and prominent brow, the fine neck, the active, pointed ear, the great power of limb, the broad quarters, the muscular thighs, and handsome tail. Such animals will sell any where.

XV. Selecting the Stallion.

In addition to what has already been said on this subject, the following, from "Stonehenge," one of the ablest of late British writers on the horse, will be pertinent as reinforcing our position: "The stallion requires several essentials—first, his blood; secondly, his individual shape; thirdly, his health; and, fourthly, his temper. But there is this difficulty in selecting the stallion, that he must not only be suitable *per se*, but he must also be adapted to the particular mare which he is to serve. Thus, it will be manifest that the task is more difficult than the fixing upon a brood mare, because (leaving out of considerations all other points but blood) in the one case, a mare only has to be chosen which is of good blood for racing purposes, while in the other there must be the same attention paid to this particular, and also to the stallion's suitability to the mare, or to "hit" with her blood. Hence, all the various theories connected with generation, must be investigated, in order to do justice to the subject; and the breeder must make up his mind whether in-and-in-breeding, as a rule, is desirable or otherwise; and if so, whether it is adapted to the particular case he is considering. Most men make up their minds one way or the other on this subject, and act accordingly, in which decision much depends upon the prevailing fashion. The rock upon which most men split is a bigoted favoritism for some particular horse; thus, one man puts all his mares to Orlando; another to Surplice or the Flying Dutchman; although they may every one be different in blood and form to the others. Now, this cannot possibly be right if there is any principle whatever in breeding; and however good a horse may be, he cannot be suited to all mares. Some, again, will say that any horse will do, and that all is a lottery; but I think I shall be able to show that there is some science required to enable the breeder to draw many prizes. That the system generally followed of late is a bad one, I am satisfied, and with constant crossing and re-crossing it is almost a lottery; but upon proper principles, and with careful management, I am tempted to believe that there would be fewer blanks than at present. I have already given my own theoretical views upon the case, illustrated by numerous examples on both sides of the question. It will now be my object to apply these views practically by selecting particular instances.

Adapting the Strain.—"In choosing the particular blood which will suit any given mare, my impression always would be, that it is desirable to fix upon the best strain in her pedigree, if not already twice bred in-and-in and then to put to her the best stallion available of that blood. In some cases, of course, it will happen that the second best strain will answer better, because there happens to be a better horse of that blood

to be had than of the superior strain, which would otherwise be preferred. If, on the other hand, the mare has already been in-bred to the extent of two degrees, then a cross will be advisable; but I am much inclined to believe, from the success of certain well-known cases, that even then a cross into blood already existing in the mare, but not recently in-bred nor used more than once, will sometimes answer. Upon these principles I should, therefore, look for success. It is surprising to me that this very common occurrence of in-breeding among our best modern horses has so generally escaped observation, and the only way in which I can explain it is by supposing, that having frequently been through the grandam on either side it has been lost sight of, because the knowledge of the sire's and grandsire's blood is generally the extent to which the inquiry goes.

Traits of Sire and Foal.—"The choice of particular stallions, as dependent upon their formation, is not less difficult than that of the mare, and it must be guided by nearly the same principles, except that there is no occasion for any framework especially calculated for nourishing and containing the fœtus, as in her case. As far as possible the horse should be the counterpart of what is desired in the produce, though sometimes it may be necessary to select an animal of a breed slightly exaggerating the peculiarity which is sought for, especially when that is not connected with a preponderance of fore or hind-quarters. Thus, if the mare is very leggy, a more than usually short-legged horse may be selected, or if her neck is too short or too long, an animal with this organ particularly long, or the reverse as the case may be, should be sought out. But in all cases it is dangerous to attempt too sudden alteration with regard to size, as the effort will generally end in a colt without a due proportion of parts, and therefore more or less awkward and unwieldly.

Sound Animals.—"In constitution and general health, the same remarks exactly apply to the horse as the mare. All hereditary diseases are to be avoided as far as possible, though few horses are to be met with entirely free from all kinds of unsoundness, some the effects of severe training, and others resulting from actual disease, occurring from other causes. With regard to fatness, there is an extraordinary desire for horses absolutely loaded with fat, just as there formerly was for over-fed oxen at Christmas. It is quite true that the presence of a moderate quantity of fat is a sign of a good constitution, but, like all other good qualities, it may be carried to excess, so as to produce disease; and just as there is often hypertrophy, or excess of nourishment of the heart, or any bony parts, so is there often a like superabundance of fat causing obstruction to the due performance of the animal functions, and often

ending in premature death. This is in great measure owing to want of exercise, but also to over-stimulating food; and the breeder who wishes his horse to last, and also to get good stock, should take especial care that he has enough of the one and not too much of the other."

XVI. How to Detect Vices and Defects.

The danger of buying a horse unsound, vicious or with some serious defect is to be carefully guarded against. For another work on the same subject, we prepared the following rules which are here reproduced as being to the point.

1.—Bone spavin, curb, ring-bone and splints.—To detect these, look at the horse from before and behind, for spavin and curb at the hocks; for ring-bone, at the fetlocks; and for splints, below the knee. Feel the bones at all these parts for tenderness or enlargement. If they appear, reject the horse instantly. He will be worthless as a sire, or for riding or driving.

2.—Stumbling.—Examine the knees to find if they are scarred, or show the marks of previous injuries, or have been operated upon for callosities. Then walk him over somewhat rough ground, and at a slow pace, with entirely loose rein, to see if he trips or goes weaker on one leg than on the other. If he is a stumbler, he is the most dangerous animal a man can own, unless it be a kicker; in fact, more so than the latter, since kicking may be guarded against, when knowing the vice.

3.—Kicking.—If this is suspected, the animal will lay back his ears if approached in an apparently careless manner, though horses do this sometimes from mere playfulness. If they are vicious, they will lay their ears more completely back, and the eyes will also denote their intention. Examine the stall where it is known they have stood for marks of their hoofs, and above all, give the animal a chance to show his propensity when the groom is not near.

4.—Pulling at the halter or bridle when tied.—Tie him up in a close yard, with a halter he can easily break, leaving him quite alone for about half an hour, to exhibit his propensity, if he will.

5.—Crib-biting.—If the horse is a confirmed crib-biter, his teeth—the central incisors—will show wear where he has grasped objects to enable him to get leverage to perform the operation. Tie him out to a stump, or at a post about three feet high, and watch him, no person being in his sight.

6.—Balking and backing.—Horses seldom balk under the saddle; when they do, they are dangerous in the extreme, often stopping suddenly when in motion, or backing into dangerous places. It is difficult to detect for they will sometimes go days, weeks and even months

all right, and then suddenly show the vice. As a rule, it is exhibited by bad tempered, badly trained horses. A warrant from a respectable owner is the best guarantee. It may sometimes be detected, if a person strange to the horse mounts and attempts to start him suddenly. In harness it may often be detected by the manner in which the animal starts and travels.

7.—The Rogue.—The rogue is the horse of vices; he may take the bit in his mouth and run away, he will rear, back, kick, strike, bite, and do twenty other unpleasant tricks, not always from pure vice, but often from exuberance of spirits, or from being crossed in some way. They generally perform well enough after they have found out that their rider is their master. They are difficult to detect in their vices, except by the thorough horseman, who is well versed in every expression and act of the horse.

8.—Bishoped Teeth.—So named from the scoundrel who invented filing an old horse's teeth to make him look young, even to burning and blackening the cups formed. A carful study of the chart of the horse's teeth, given in this book, will enable any person to detect this, since it is impossible to cover the shrinking of the gums, by which the teeth show narrow, and are peculiar in shape.

9.—Weak Eyes.—Whatever the occasion, have nothing to do with a horse with bad eyes. Bring the animal from a rather dark stable just inside the door where the full light may strike the eyes. Examine the lids and pupils carefully, to see if there is any considerable shrinking; the eye should be able to bear the full light. Horses are sometimes near-sighted, and also far-sighted. *Nearly all shying horses become so either from defect of vision* or from cowardice.

10.—Moon Eyes.—This is a specific ophthalmy, from which one or both eyes periodically change color, and during the paroxysm it may become entirely blind. During the interval the eyes look natural. It is better, if the buyer suspects this, to take a warranty against it.

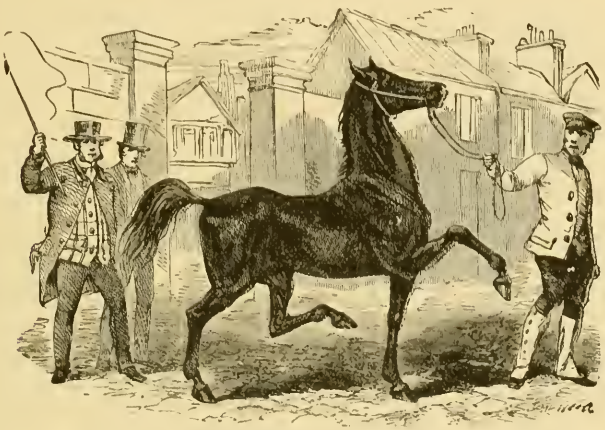
11.—Blindness.—This is sometimes difficult to detect by the ordinary observer by looking at the eyes. In rare cases the eyes may seem natural. A blind horse, however, may be detected by his mode of progression. As an example we give an illustration showing the mode of progression of a totally blind horse.

XVII. Some Faults and Imperfections.

The disabilities noticed in the previous sections are those of positive unsoundness, or else of determined vice. Some others, that should not be overlooked, are easily discovered by careful examination and test. These are:

1. Glass Eye.—This, if not complicated with specific disease, does not interfere with sight in any respect. It is a serious defect, simply so far as looks are concerned. Usually one eye has this peculiar white glassy appearance, the pupil perfect, and the iris quite natural. It should affect the price of the animal, only as detracting from elegance.

2. White Spot.—Sometimes a small, white spot will appear on the eye of a young horse, generally after three years of age, and usually near the outer corner. It has a peculiar cloudy appearance, sometimes increasing to the size of a hemp seed, and occasionally larger. The duration is variable, sometimes lasting for years, and again disappearing in a short time. It really impairs the vision but little, if any. Unless



Exaggerated Illustration of a Blind Horse in Motion.

its history is known, a veterinary surgeon should decide whether it is incipient cataract or not. Some veterinarians have termed it spurious cataract, but this is entirely a misnomer. The name white spot describes it perfectly.

3. Roaring.—This is the result of obstruction in some part of the larynx or trachea, impeding the breath, and causing a peculiar roaring sound when the animal is in motion. It is rarely found in the United States, and is chiefly confined to draft horses. It is often the result of chronic cough. In England it is quite common, and when present in a horse of fast work, will render him worthless for the road. It may be discovered by urging the horse to a fast gait.

4. Oblique Tail, or Wry Tail.—This is caused by contraction of the muscles of the tail on one side. It may sometimes be improved by a surgical operation, and should be considered a serious defect in any horse, and especially so in a driving horse.

5. Turning the Toe of the Hoof out or in Unduly, Sand Cracks, Quarter Cracks, Dish Hoofs, Overreaching, Interfering, etc., are all to be looked for before finally buying a horse. They are all disabilities that should not be present when the purchaser pays full price for the animal. They are, however, all so apparent that the purchaser is to blame if he fails to see them.

6. Wolf Teeth.—These rudimentary teeth which are found in some horses but not in mares, and which have been supposed by ignorant persons to produce blindness and other diseases, are entirely harmless, except for the abrasion they sometimes occasion to the tongue and cheeks. If they do so they are easily taken out by any sensible blacksmith. In fact it is quite well to extract them, not that they will produce serious disease, but simply because they are not of any value, are useless to the animal, and may occasion slight inconvenience.

7. Shying.—This is one of the most dangerous habits a horse can have, whether it be occasioned by cowardice—seldom the case; injudicious punishment—more common; or from defective eyesight, or from all these combined. If you are so unfortunate as to have a shying horse endeavor to break him of the vice by allowing him to examine objects of which he is afraid, by speaking soothingly to him, but never by whipping or spurring him. When he shows a disposition to shy, turn his head to, rather than from, the object. Stop him; let him approach the object and touch it with his nose, for soon he will approach it himself. If simply caused by nervousness, he may thus be cured. If caused by being short sighted there is no means of relief. Before you buy a horse be certain that he has not this infirmity, as dangerous a one as it is disagreeable. Such an animal is only fit to be driven by the side of another horse who will keep him to his work, and upon which he at length will come to depend, or of being driven as a wheeler in a team of four horses.

XVIII. What Is Unsoundness?

Unsoundness is any disability that interferes seriously with the proper labor of the horse. The most serious are:

1.—*Spavin*, whether it be *bog spavin*, *blood spavin* or *bone spavin*, when sufficiently developed to be known.

2.—*Ossification* of any of the structures adjacent to any of the joints and also without doubt ossification of the lateral cartilages.

3.—*Corns* are considered as constituting unsoundness, but they must be discovered within a short time, say a few days of the purchase.

4.—*Curbs* constitute unsoundness, but they must be shown to exist at the time of the sale.

5.—*Founder* or *Laminitis*, is unsoundness whether it produces lameness or not, for if it has existed the laminæ will have been injured and the horse will be lame when worked.

6.—*Pumiced Foot* is unsoundness as evidence of laminitis.

7.—*Quittor* may render the horse permanently unsound.

8.—*Ring-bones* and side-bones constitute unsoundness.

9.—*A Nerved Horse* is unsound as showing the existence of disease for which the operation was performed, and also from the division of the nerves.

10.—*String-Halt* is unsoundness.

11.—*Thrush* is so when severe.

12.—*Breaking* down, even though the horse has recovered so as not to go lame.

13.—*Thickening of the Back Sinews*, or suspensory ligament, if known to exist, is unsoundness.

14.—*Broken Wind*, *Thick Wind*, *Whistling* and *Roaring* are all considered as constituting unsoundness, as forming impediments in breathing, injuring the animal for drawing or other active service.

15.—*Farcy and Glanders.*

16.—*Grease and Mange.*

17.—*Cough*, if it lasts. A horse with a chronic cough is clearly unsound.

18.—*Megrims*, if it can be shown that the horse has had an attack before the sale.

19.—*Ophthalmia*, if it occurs soon after the purchase. The evidence of a veterinary surgeon may be necessary to show the previous presence of the disease.

20.—*Cataract*, however slight, constitutes a horse unsound.

21.—*Broken knees*, when the joint is injured.

There are also vices for which a horse may be returned. These are:

1.—*Biting*, when clearly vicious.

2.—*Bolting*, or running away.

3.—*Crib-biting.*

4.—*Kicking*, when shown to be vicious.

5.—*Balking.*

6.—*Rearing.*

7.—*Shying*, when habitual.

8.—*Weaving in the stable*; that is, the horse throwing his head and body from side to side with a peculiar motion.

XIX. Blemishes.

The following defects would not be considered as constituting unsoundness unless they should become so serious as to interfere with the usefulness of the animal. Some of them, however, are blemishes, and in the case of broken knee, it would be well to know how it came. They are, *1—Slight bog sparin*; *2—broken knee*, when the joint is not injured: *3—capped hocks*, or elbows: *4—contraction of the foot*, unless the result of disease, laming the horse; *5—curby hocks; 6—splints*: *7—thorough pin*, and *8—thrush*, are not unsoundness in their incipient stage, or in a mild way. But the buyer should refuse all such except, perhaps, in the case of thrush. *9—Cutting* is not unsoundness, except the horse be lame at the time of sale, neither *10—soreness* of the joints from labor, or *11—windgalls*.

PART II.

Diseases of the Horse.

HOW TO KNOW THEM, THEIR CAUSES, PREVENTION AND CURE.

Diseases of the Horse.

CHAPTER I.

SYMPTOMS AND GENERAL TREATMENT.

I. INTRODUCTION.——II. OUTWARD MANIFESTATIONS OF DISEASE.——III. SYMPTOMS OF INTERNAL DISEASES.——IV. IMPORTANCE OF PROMPT TREATMENT.——V. KNOW WHAT YOU ARE TREATING.——VI. NURSING AND FEEDING SICK ANIMALS.——VII. EXPLANATION OF TERMS USED.——VIII. GRADUATION OF DOSES.——IX. HOW OFTEN TO GIVE MEDICINES.——X. FORMS OF MEDICINES AND HOW TO ADMINISTER.

I. Introduction.

The horse, especially when subject to artificial care and conditions, and more especially in cities and large stables, is liable to pretty much the same diseases, or, at least, to diseases similar in their nature to those of man. Besides various epidemics, such as lung diseases, colds and influenza,—diseases arising from injuries, and bad care, involving diseases of the skin and its integuments, and of the ligaments, muscles and bones, are quite common in horses. Such diseases are comparatively rare in the human family, for the reason that horses are often put to terrible strain in running, leaping, drawing heavy loads in the mud, and on rough pavements, etc. These, from the want of proper knowledge, or from neglect, assume the most serious forms, and often totally unfit the horse for active labor, if they do not entirely ruin him.

The importance of common-sense treatment and training has been fully elucidated in the preceding pages. The importance of proper care, sufficient clothing, grooming, good ventilation, and kindness in their general treatment has also been insisted on. If the information to be given in the succeeding pages, relating to proper care in sickness, is observed, much trouble and loss will be saved to the farmer, who is often necessarily precluded from calling in the services of a competent veterinary surgeon, because, in many country districts ,there are none.

The object of this work, therefore, is to give, in plain language, the necessary treatment of such diseases as may be cared for, by other than the professional surgeon; and to give such advice as will prevent the occurrence of many disabilities, which, if taken out of the list, by their prevention, would very much lighten the task of the veterinarian. These should be well known and carefully studied by every horse owner, for thus might often be prevented spavin; curb; splint; ringbone; caries,

in its various forms; swellings of the muscular integuments, causing serious trouble; injuries to the sinews, causing breaking down; poll evil and other fistulous affections; fractures; founder; grease; inflammations of the glands and veins; cracked hoofs; quittor; hernia and many other diseases, not recognized by the horse owner, as a rule, until they have become serious.

A careful attention to symptoms which will be given in plain language, and the application of appropriate remedies, will save the owner money, and at the same time will also save the most intelligent servant, and if allowed to be, the faithful friend of man, much terrible torture. The feet and limbs are most liable to disease. Those who have suffered from the torture of a tight boot, can only form a partial idea of the agony of a horse suffering from disease of the feet, and especially from navicular disease, attacking, as it does, the most delicate organs, encased in the horny covering of the foot. The *causes* of disease, therefore, *how to know it* by outward symptoms—for the horse cannot tell his distress, except by mute signs, and *what to do*, will be told in the following pages. In cases where danger is present from contagious and utterly incurable diseases, as glanders, or incurable infectious diseases as hydrophobia, the animal should be quickly and mercifully killed, and buried deep out of the way of danger.

II. Outward Manifestations of Disease.

To make plain what would otherwise not be readily comprehended, the diseases will be illustrated by cuts. These cuts will often present the disease in its strongest forms, whereby the same difficulties will be the more easily recognized in their lighter manifestations. Many of the diseases of the skin, and especially of the bones, may go on for a long time without the cause being surely known. Hence the illustration of some internal diseases, as shown outwardly, will be very instructive. The most of them are caused by neglect or abuse. Their treatment will be given in their proper places, as, for instance, those of the feet, in the next chapter. The condensed description of their origin, with references to the illustration on the next page, will enable them to be readily recognized.

A—Caries of the Jaw. Ulceration of the lower jaw, sometimes ends in mortification. Caused by bruises from barbarous bits and curb chains.

B—Fistula of the Parotid Duct. Fistulas are caused by bruises or undue compression of the parts, producing inflammation and abscess.

C—Bony Excrescence. (Exostosis of the jaw). A blow upon a bone will produce inflammation followed by exostosis (bony growth through increased nutrition)—that of the joints being fearfully painful.

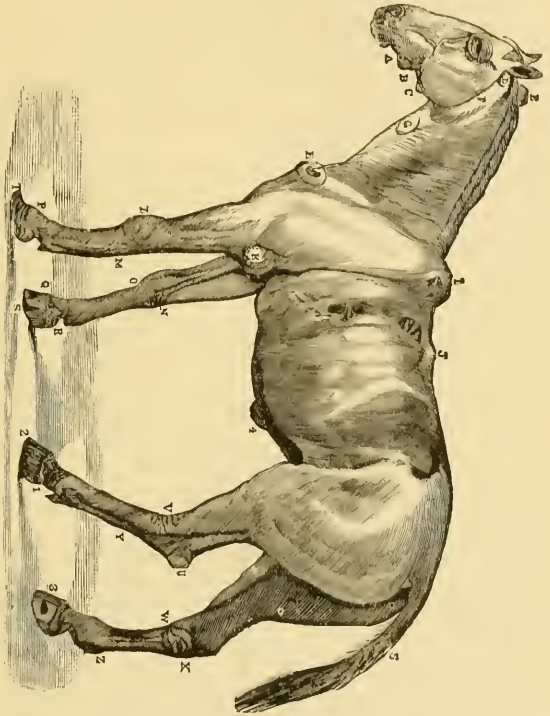
D—Swelling by pressure of the bridle, causing inflammation, and sometimes tumors.

E—Poll Evil. A painful fistulous disease, often difficult to cure.

F—Inflamed Parotid Gland, caused by a bruise or compression.

G—Inflamed Jugular Vein, caused in various ways, often by carelessness after bleeding

H—Callous'd Tumor, from compression of the collar. The result of galls and subsequent want of care, and inattention.



I—Fistula of the Withers, caused generally by pressure of the saddle.

J—Saddle Gall, caused by a bad fitting saddle; sometimes ending in sitfasts.

K—Shoe Boil, caused generally by interference of the shoe in lying down.

L—Induration of the Knee, caused by blows in falling.

M—Sprain of the Back Tendons, Caused by severe exertion in running and leaping, destroying the integrity of the sinews of the leg.

N—Mallenders, Scurfy manifestation at flexions of the knee, sometimes becoming cracked and itchy.

O—Splint, Caused by blows, kicks, and sprains on the shins. They are to be dreaded as interfering with the action of the sinews.

P—Ringbone, Caused by starting heavy loads, or excessive pulling in going up hill and by sprains of the joints.

Q—Tread upon the Coronet, the contusion of the shoe of one foot by treading on the other, causing laceration of the coronet and of the horn of the hoof.

R—Quittor, Breaking out of pus at the top of the hoof from prick of the sole, corns, or injury to coronet.

S—Quarter Crack, Imperfect secretion caused by dryness of the hoof; rupture of the laminæ.

T—Contracted Hoof, or ringed hoof of a foundered horse. The result of Laminitis.

U—Capped Hock, Swelling on the point of the hock.

V—Sallenders, Scurfy eruptions on the seat of flexion of the hock. Similar to mallenders.

W—Sparin, Inflammation causing painful bony enlargement, sometimes stiff joint. Caused by blows, slipping and hard work, often from weak limbs and sprains.

X—Curb, Inflammation and lameness of the posterior part of the hock, ending in bony formation. Caused by wrenching or straining the ligaments.

Y—Swelled Sinews, Caused by strains or bruises, producing inflammation, and ending in enlargement.

Z—Thick Leg, Caused by various injuries to the joint. Any inflammation may result in a thickening of the integuments. In all inflammatory difficulties of this nature, including, spavin, curb, etc., cold water faithfully applied at the outset will be indicated, but often the trouble is not known until too late for cold water. The warm water fomentations will then be indicated.

1—Grease, Caused by debility, excessive labor and neglect, filthy surroundings, from stoppage of the secretions, surfeit and impurities in the blood. Scratches are from the same cause, as working in the mud without proper cleaning, etc.

2—Sand Crack, Caused by the same difficulty as quarter crack.

3—Quarter Crack—Horizontal. These are occasioned generally by severe labor of animals not strong in the feet, by which the walls are

ruptured, by breaking the hoof with the calk of another foot. False quarter is occasioned by the absence of the outside and harder portion of the hoof.

4—Ventral Hernia, Rupture by which the bowel lies next the skin. When hernia is accompanied with strangulation it becomes dangerous.

5—Rat Tail, Loss of the hair of the tail.

III. Symptoms of Internal Diseases.

Internal diseases cannot be illustrated except to depict the actions of the animal when suffering with derangement of the internal organs or their connections. Their actions, such as position, standing, lying, rolling, kicking, jumping, running etc.; inclinations, such as the appetite, either ravenous or lost; thirst, either excessive or none, etc., are all condensed into one word, Symptoms. They express the feelings and appearances of the animal, and these, along with a few scientific observations, are all we have to rely upon to diagnose (recognise) the disease. Hence, it is of vital importance to be cognizant of the actions, habits, constitutional condition as to pulse, respiration, digestion; color and quantity of the excretions; nature, quality and quantity of food required; characteristics of age, length of time *in utero*, development and longevity; in fact all the characteristics of health, in order to be able to know when an animal is sick. The sooner sickness is recognized and given the proper treatment, the sooner health will be restored and the less will be the liability of death and loss; and from a humane point of view, the less the animal will suffer from extensive lesions.

IV. Importance of Prompt Treatment.

A stitch in time saves nine. There is nothing in which this true saying applies more forcibly than in the treatment of ailments of all kinds, either external or internal. For instance, a horse goes lame from a corn; if attended to properly it is cured in a week; if neglected it festers, spreads, works up through the foot and breaks out at the top of the hoof, forming a quittor, which takes from one to three months to cure, the animal necessarily being idle nearly all the time. Or the horse catches cold, has catarrh, running from the nose and eyes, sore throat, cough and loss of appetite; and if promptly and properly treated he may be cured in from two to ten days. But if neglected for a day or two, to see if he will get well without any bother or expense, the disease is almost sure to run down onto the lungs and cause a sickness very painful, of long duration, considerable expense and possible fatal termination.

V. Know What You are Treating.

Therefore we would urge as a matter of very great importance that the course adopted in case of sickness or lameness be applied promptly and

thoroughly, yet with sufficient caution to be convinced that you are on the right track, so as not to be treating an ankle because it is cocked when every particle of the lameness is in the foot, or dosing a horse for bots when the trouble is pleurisy, or giving a dog medicine for inflammation of the brain when he is suffering from rabies.

These and many other similar mistakes have come under the observation of the writer. One notable case, in which many might have been deceived, was seen not very long ago; a horse was blistered from one knee up the leg, over the shoulders and withers and down on the other side to the knee for sprain and soreness in the shoulders, when every bit of the disease lay in the feet. It was a case of acute founder. We relate this to impress upon the reader the necessity of careful, deliberate study of a case before taking action; but when the derangement is conclusively located go ahead and apply promptly the remedies prescribed.

VI. Nursing and Feeding Sick Animals.

Much ingenuity can be displayed in nursing a sick animal. In order to do it intelligently the nurse must be familiar with the habits and requirements of the animal in health. A few simple rules will assist the amateur. Make the animal as comfortable as possible, warm in winter and cool in summer. Give plenty of fresh air to breathe, but in all cases avoid a draft; ventilation without drafts is the rule. Clothing for horses is often necessary, woolen blankets in winter and linen sheets and nets in summer. Hoods to cover the head and neck are often needed if the stable is not sufficiently warm. The proper temperature for the stable that is used for the hospital is from 55° to 60° F. This is warm enough for all animals except very weak lambs and sick dogs; they require a warmer room, from 62° to 70° F. A part of the dwelling house is the best for them, if they are not too numerous.

See that the place is dry and the drainage good. An elevated location is better than a low-lying one.

The food wants to be simple, clean, nutritious, easy of digestion by being cooked, changed occasionally and administered often and in small quantities. Give green food, always, when it can be got. Oats, corn, barley, bran, shorts, etc., may be scalded with boiling water, covered and left to steam till cold, and then given. It is a great advantage to have the grain ground. Hay and water should always be given in liberal quantities; and see that they are clean and pure. Warm milk for calves, and the same diluted and sweetened a little for lambs and foals; beef tea, raw eggs, porridge of either oat or corn meal and milk for dogs, and the same for pigs will be found to be the best diet. In feeding sick animals give a little, often, but be careful not to over-feed, as that is liable

to throw the patient back and increase fever. Horses, cattle, etc., need to be fed three or four times a day; foals, calves, lambs, dogs, etc., every two to four hours.

Fever patients should have pure water near, so they can help themselves when they wish it. Those suffering from diarrhoea or excessive purgation should be watered four or five times a day, but in smaller quantities.

Rest should always be given to sick animals; many cases prove fatal from working too long after being taken sick, or from being put to work too soon after recovery.

VII. Explanation of Terms Used.

To some readers a few words of explanation may be necessary in order to the proper understanding of the drugs and their doses.

Alteratives change the conditions and functions of organs.

Anæsthetics deprive of sensation and suffering.

Anodynes allay or diminish pain.

Antacids are antidotes to acids.

Anthelmintics kill or expel worms.

Antiperiodics arrest or retard the return of a paroxysm in periodic diseases.

Antiseptics prevent, arrest or retard putrefaction.

Antispasmodics prevent or allay cramps.

Aperients gently open the bowels.

Aromatics, strong-smelling stimulants, dispel wind and allay pain.

Astringents cause contraction of vital structures.

Carminatives, warming stimulants (Aromatics).

Cathartics, *Purgatives*, freely open the bowels.

Cholagogues increase the secretion of bile.

Demulcents sheathe and protect irritated surfaces.

Diaphoretics, *Sudorifics*, cause perspiration.

Discutients dispel enlargements.

Disinfectants destroy infecting matter.

Diuretics increase the secretion of urine.

Ecbolics, *Parturients*, cause contraction of the womb.

Emetics induce vomiting.

Expectorants increase the secretion from the air tubes.

Febrifuges counteract fever—lower temperature.

Laxatives (Aperients).

Narcotics allay pain and produce sleep.

Refrigerants diminish heat.

Sedatives depress nervous power or lower circulation.

Soporifics induce sleep.

Stimulants temporarily excite the nervous or circulatory system.

Sialogogues increase the secretion of saliva.

Stomachics improve digestion.

Tonics gradually and permanently improve digestion and nutrition.

Vermifuges kill and expel worms.

VII. Graduation of Doses.

The relation of quantity of medicine to the age of the patient is thus given by Prof. Low: The doses given may be held applicable to full grown animals of medium size, therefore some allowance must be made in any case in which the patient exceeds or comes short of the average of his kind. A similar modification must be made as regards young animals, not only on account of their smaller size but also of their greater susceptibility. The following table may serve as a guide:

HORSE, ETC.	OX.	SHEEP.	SWINE.	DOGS.	DOSE.
3 years.	2 years.	$1\frac{1}{2}$ years.	15 m'ths.	$\frac{1}{2}$ year.	1 part.
$1\frac{1}{4}$-3 "	1-2 "	9-18 m'ths.	8-15 "	3-6 moths.	$\frac{1}{2}$ —
9-18 m'ths.	6-12 m'ths.	5-9 "	6-8 "	$1\frac{1}{2}$-3 "	$\frac{1}{4}$ —
5-9 "	3-6 "	3-5 "	3-6 "	20-45 days.	$\frac{1}{8}$ —
1-5 "	1-3 "	1-3 "	1-3 "	10-20 "	$\frac{1}{16}$ —

Allowance must also be made for a nervous temperament which usually renders an animal more impressible, for habit or continued use which tends to decrease the susceptibility for individual drugs, for idiosyncrasy which can only be discovered by observing the action of the agent on the particular subject, and for the influence of disease when that is likely to affect the action. Thus in most diseases of the brain and spinal cord, and in some impactions of the stomach, double the usual quantities of purgative medicine will be necessary, while in influenza and other low fevers half the usual doses may prove fatal. In acute congestion of the brain, stimulating narcotics (opium, belladonna, hyoscyamus,) would aggravate the symptoms, etc.

IX. How Often to Give Medicines.

Febrifuges, or doses intended to reduce fever, such as aconite, belladona, spirits of nitre, solution of the nitrate or chlorate of potash, or any form of ammonia should be repeated as often as every two hours in bad cases, and from that to three or four times a day in mild cases. Alteratives may be repeated once or twice a day. Purgatives may be repeated after twenty to thirty hours in bad cases, and after forty to forty-eight hours in mild cases. Tonics should be repeated once, twice or thrice a day. Stimulants, especially alcoholic, may be repeated after two to six hours. Ecbolics may be repeated after half an hour; anodynes after half an hour; other remedies as required.

X. Forms of Medicines and how to Administer.

Medicines should always be given in the food or drink, when possible, to avoid worrying the patient and also to avoid the danger of choking from the liquid running into the lungs. When the medicine is nearly inodorours and tasteless it can be mixed with bran mashes, or other soft feed. Aloes should be made into a roll the size and shape of your finger and wrapped in thin paper or put into a gelatine capsule, and passed back onto the root of the tongue of the horse.

Liquid medicine, in large doses, is given as drenches out of a strong-necked bottle or horn, the head being elevated and the neck of the bottle inserted at the side of the mouth and poured very slowly in, the head being kept raised till all is swallowed. If the patient coughs while being drenched, let the head down instantly, regardless of the loss of the medicine, for, if kept up, it is apt to run into the lungs, and cause death in two minutes.

MANNER OF GIVING A DRENCH TO A HORSE.

Small doses are best given with a syringe; open the mouth with the left hand and insert the syringe in the left side of the mouth, and shoot the contents well back into the throat. A syringe or spoon may be used on all small animals.

Medicine for cattle and and sheep needs to be more bulky and watery, on account of the great size, comparatively, of the stomach, and when not practicable to administer it in the food, it should be dissolved in from one to two quarts of water for cattle, and one to two pints for sheep, and given as a drench from a bottle or horn.

Care should be taken to avoid letting the animal bite the bottle; keep the neck of it firmly up against the roof of the mouth between the two rows of upper teeth. If the animal should break the bottle, let the head down instantly and remove the broken glass as quickly as possible.

CHAPTER II.

FEET OF THE HORSE AND THEIR DISEASES.

I. CORNS.——II. QUITTOR.——III. QUARTER AND SAND CRACKS.——IV. SEEDY TOE.——V. PRICKING FROM NAILS——VI. ACUTE FOUNDER OR LAMINITIS.——VII. CHRONIC FOUNDER OR LAMINITIS.——VIII. PUMICED FEET.

I. Corns.

There is no ailment so common to horses' feet as corns. Fully nine-tenths of the lameness in the feet are from this source.

Causes.—They are the result of uneven pressure of the shoe, too much bearing on the quarters, especially the inner one, and too heavy bearing on the heels. This results from the shoes being left on too long without being reset, and the feet pared down and the heels opened to remove the surplus growth of hoof, that would be worn off if the foot were not shod. Corns are often caused by contraction of the feet, the pressure on the walls of the quarters, by the contraction of the hoof, being very great.

SOLE OF A FOOT.

Showing a small scarlet spot, indicating a new corn.

It is necessary, as a rule, to shoe horses' feet, and in order to keep them healthy the shoes should be reset about once a month, the sole and wall reduced to their proper size, heels opened, and the ragged surface, if any, trimmed off the frog. The effect of the too heavy bearing on the quarters and heels is to bruise the soft parts underneath, giving rise to soreness, and after a day or two a reddish or purple spot will appear, varying in size from a ten cent piece to that of a quarter of a dollar. If the bruising is light, the corn may become caloused and remain a constant source of lameness, but not very severe, for a long time; but, if it is bad, the corn soon festers, matter forms and increases, spreading in all directions, till it gets vent either by being opened at the bottom, or breaks out at the top at the junction of the hoof and hair, forming a quittor.

How to know it.—Lameness appears, slight at first, but increasing very fast from day to day. The horse will show an inclination to favor the sore quarter, and will not wear the shoe quite so much on that heel. By applying the hand to the foot, you will notice heat in the sore part.

Tapping the foot gently with a hammer will make the horse flinch when the sore spot is reached, and he will point the foot (thrust it out forward) resting it on the toe, raising the heels completely off the ground. If there are corns on both feet, he will change feet, will point first one, then the other. If the corns are small and not very sore, the lameness may diminish with travel, so that when well warmed up he will go quite sound, till he stands at rest again. Then he will go off lamer than ever. When the corn is festered, he will be very lame, indeed, will only touch the toe to the ground, will move with the greatest difficulty and reluctance. When the shoe is removed, you will find the purple spot in the quarter, between the wall and the bar, near the heel.

SOLE OF A FOOT.

Showing the usual position of a corn.

What to do.—Remove the shoe, pare out the quarter well, so as to remove all pressure, and let out any matter that may be under the sole; then put the foot into a linseed poultice made up soft with hot water. Leave it on twenty-four hours, then renew it. While the poultice is off, examine the foot to see if it needs any more paring; if the hole is deep, you will need to cut the hoof well away to allow the matter to escape freely; for if you do not, it will work up through to the top of the hoof.

Before putting the poultice on again, pour into the corn a little pure carbolic acid, or turpentine, or dilute nitric acid—diluted one-half with water. Dress it in this way once a day till all soreness is gone, and the horse will stand on the foot as well as ever. Then leave off the poultice.

If proud flesh comes up in the hole, burn it down with powdered blue vitriol. The hoof you have pared away will soon grow again. When it has stopped running, apply the vitriol once a day, which will dry and heal it. When it is all dry, and the horse walks sound on the foot, put on a bar shoe to protect the weak quarter, giving the frog gentle pressure; pour warm tar into the hole, and stuff oakum or tow soaked in tar under the shoe. When shoeing afterwards, bear in mind to avoid too heavy bearing on the heels. When that quarter has grown out again, and is strong, the bar shoe may be replaced by an open one.

If the foot is much contracted, take the bearing off the quarters by reducing the walls a little, so as to have the appearance of the shoe having been sprung off the heels, but let the shoe be perfectly level. Open the heels well up towards the hair, so as to give the feet a chance to spread while growing.

When a foot is much inclined to have corns, the shoe should be reset often—every two or three weeks—and the quarters well cleaned out each time.

Extra care will have to be taken of the feet that have once been affected with corns, to keep them soft. Soak them in a tub of either cold or

warm water. Some add salt, soda, etc., but it is better clear, as the only virtue lies in the moisture. Many of the substances used are injurious to the hoof, by making them brittle. Or pack the hoof with linseed meal, or oil-cake meal, wet up with hot water. If there is much heat and fever, put on swabs, either made of felt or pieces of old blanket or woolen cloth, folded and tied around the pastern, and left to hang down over the feet, and wet frequently with hot water.

II. Quittor.

Quittor is the name given to a disease of the foot, when the festering of any other sore works up through, and breaks out at the top of the hoof at the junction with the hair.

Causes.—It is usually the result of a neglected corn, prick of a nail, gravel getting into a nail hole, or a festered corn working up through to the top of the hoof.

How to know it.—It usually occurs on the quarters, anywhere from the heels to two or three inches forward, but is oftener seen on the inner quarter, because corns are most often found there. It makes its appearance, after the horse has been lame for some time, by swelling at the coronet. Sometimes the first active swelling of the part is as large as a hen's egg. In the course of a day or two it breaks and discharges matter, when the horse will be relieved of some of the pain, which has been very intense during the formation of the sore. Sometimes the foot can scarcely be put to the floor at all, and may be kept paining much of the time.

A QUITTOR.
In active suppuration, before the pus has broken out at the top.

After the quittor has been running two or three days, the flesh around the opening will turn purple and get soft, and the matter will spread, extending each way, but more towards the front. In a couple of weeks pipes will have formed, pointing downwards in all directions, having one common center in the opening at the top.

If let alone, the walls of the pipes will thicken and harden, and the enlargement at the top will increase sometimes to the size of a man's fist. All this time the lameness continues very great, and, if allowed to run on for three months or more, the foot becomes so full of pipes and so large, hot and painful as to require very persistent and thorough treatment to stop the disease, and can never be reduced to its natural size and form. In extreme cases lameness is permanent, with a tendency of the toe to turn up, and the horse walks on his heel.

A QUITTOR.
After it has broken out at the top.

What to do.—If taken as soon as it breaks open at the top, poultice the foot for twenty-four hours, to soften all the parts. Then give the

diseased part vent at the bottom, to allow the matter, if any, to run out there if it will; but if none is found at the bottom, do not cut the hoof to make it bleed, as that would only make another sore, and would do no good. Open it freely at the top; probe it with a piece of smooth, rounded whalebone to find how deep the hole goes, and in what direction. Then follow the probe down with the knife, and open right out and down the hoof, as far as the hole goes, taking out a V shaped piece of the wall to allow the matter to escape at the bottom, instead of making it come out at the top. Scarify the purple flesh to set up a healthy, artificial inflammation in the part. Then sponge it out with warm water to cleanse it, and follow with a lotion made as follows:

No. 1. 2 Drachms sulphate of copper.
½ Pint water,
Mix.

Inject it well down into the wound, twice a day. If it burns and causes a scab to come on the flesh, dilute it a little after using it three or four days. If after a week or ten days the wound does not appear to be getting well, change to the following:

No. 2. 3 Drachms sulphate of zinc.
½ Pint water,
Mix.

By being careful that the opening is down to the bottom, all the time, to let the matter out, you will have no trouble in curing it. Keep the shoe off till the foot is well enough to work; then put on a bar shoe so as to protect the weak quarter.

In very bad cases, in which there are several pipes running in as many directions, it is absolutely necessary to open up each one fearlessly. Then go on with the lotions given above, and change occasionally to the following:

No. 3. 1 Drachm corrosive sublimate.
½ Pint water,
Mix.

In long continued treatment it is advisable to alternate the lotions, one week on, and one off.

The hoof will grow faster on account of the inflammation in it, so that it will be necessary to have the foot pared down occasionally. When the discharge is all dried up and the disease is cured, blister the enlargement to reduce it. After the blister has taken hold, grease the part once a day, till it is nearly well, then repeat the blister. Soak the foot often, and pack it with oil-cake meal, to keep it soft.

III. Quarter and Sand Cracks.

These are cracks in the hoof, usually lengthwise of the fibres of the hoof, though sometimes the hoof breaks across the fibres for a distance of an inch or so. But the crack rarely extends through the hoof into the laminae, or quick, consequently it does not cause lameness.

QUARTER CRACK.

Quarter cracks come on the quarters, usually on the inside, on account of that quarter being thinner and weaker than the outer one.

Sand cracks come on the wall of the foot, anywhere forward of the quarters, and are so called on account of their being more common in sandy parts of the country.

These cracks are due to a brittle condition of the hoof, and a want of elasticity in the fibres.

Causes.—Poor assimilation, or faulty distribution of the food and a want of proper nutrition to the hoof, are principal causes giving rise to a slow growth. What does grow is hard, brittle and inelastic. Sometimes the hoofs become cracked from the heating, drying influences of sandy roads, stony pavements in cities, and long continued want of moisture to the feet. When the feet are in this condition, any severe work or pounding of the hoofs is liable to break them. Racers and trotters are particularly subject to them, because the tracks are sometimes very hard, and the tremendous exertions of the horses, and the pounding of the feet on the track, are peculiarly trying to the hoofs; and unless they are in first-class condition, they are apt to crack.

FALSE QUARTER
Or deficiency of the outer wall.

How to know it.—A crack or split in the hoof, it may be only at the top or at the bottom, and very short, or in the centre, from top to bottom; or it may extend clear from the top to the bottom. It may extend inward but a little way, or it may be deep, clear into the quick, so that the soft parts are pinched between the edges of the crack, making it bleed and causing great lameness. The lameness may come on gradually or suddenly. It depends upon whether the crack starts on the surface and increases in depth with every strain, or whether it breaks right through to the quick at once. In the latter case, the horse will go dead lame immediately, and oftentimes the blood will run from the crack. But in the former case he will not be lame till the crack does extend through to the quick.

As in all cases of lameness in the foot, where there is pain, he will point the foot, that is, thrust it forward, to rest it.

What to do.—Remove the shoe and reduce the wall of that quarter, to take off the bearing. If it is broken through into the quick, take a sharp shoeing knife and pare down the edges of the crack the whole length, enough to relieve the pinching, and for a distance of half an inch on each side of the crack, to make it more pliable. Then take either a sharp knife or a red hot iron, with an edge to it, and cut or burn across the crack at the top, right through to the quick. Make the cut at least an inch long; this is to start a new hoof and make it grow down sound and naturally.

If the crack does not extend clear through the hoof, it is not necessary to pare away the edges. If there is no lameness, you may be certain it is not broken through into the quick, for if it is the horse will go lame. It is a good plan to cut or burn across the crack at the top, and take off the bearing at the bottom, but do not cut or burn so deep as in the more severe case. Then have a plate either of brass, copper or iron, half an inch wide, and an inch and a half long, screwed on across the crack; have the screws about a quarter of an inch long, and screw them into the hoof, while an assistant draws the edges of the crack together with a pair of pinchers, the horse at the time standing on the other foot to take the weight off the one operated on.

QUARTER CRACK

Cut across the top, the bearing taken off at the bottom, and shod.

As the foot grows, the plate will have to be moved down, about once a month or six weeks, or, perhaps, not oftener than once in two months, according as the hoof grows fast or slow.

QUARTER CRACK.

Showing the hoof broken only part way up; dressed, pared and shod.

If flesh grows up between the edges of the crack, burn it down with powdered blue vitriol, applied once a day. When it is dry, and the soft parts are healed by the vitriol, dress it with pine tar once a day.

CLOSING A HOOF CRACK.

By the use of thin wire.

In all cases blister the coronet at the junction of hoof and hair, clear around from heel to heel, but do not blister back of the heels, in the hollow of the pastern. Let the blister be of cantharides (Spanish flies.)

If the cracks are bad, it is best to shoe with a bar shoe, which should be reset every three or four weeks.

Cracks that break crosswise of the hoof seldom amount to disability. If there is any flesh exposed, dress it with

powdered blue vitriol once a day, till it is dry, then with tar. No change will be made in the shoeing.

FALSE QUARTER.

Relieved of bearing on the shoe.

SAND CRACK.

Pared away at the sides and bottom, to remove bearing also method of shoeing with clips to support sides of crack.

SAND CRACK.

Dressed, shod and bandaged for work, when rest cannot be given.

IV. Seedy Toe.

Seedy toe is a dry, mealy condition of the wall at the toe.

Causes.—It is caused usually by bruising of the toe, by the clip of the shoe being pounded into the toe too tightly; and the bruised part takes on a sort of dry rot, or gangrene, which extends up between the wall and the laminae. It causes tenderness of the foot when bad, but is rarely met with. It is a separation of the two layers of horn which compose the crust of the hoof, resulting from disease due to bruises or faulty condition of the body.

SEEDY TOE.

Showing the separation of the wall from the soft parts underneath.

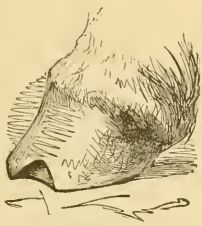
How to know it.—When the shoe is removed, a mealy, whitish-looking substance will be seen immediately under the wall, at the toe, running up towards the hair, sometimes for an inch or so, and may be picked or broken down easily with a nail, leaving a hollow beneath the shell.

What to do.—Pare away the wall at the toe after taking off the shoe, so as to remove the bearing therefrom. Pick out all the mealy substance that breaks down easily, and turn in warm tar, and press in a little wad of tow. Replace the shoe, and apply a mild blister of cantharides to the coronet.

Prevention.—Avoid pounding the clip of the shoe into the toe, but cut away a little of the wall to form a hollow place for it.

DIAGRAM OF SHOE.

Showing clip that is hammered into the toe, sometimes causing seedy toe.



VIEW OF A FOOT.

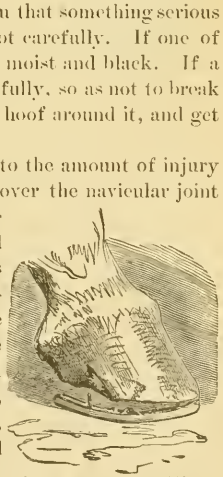
Showing toe pared to receive the clip to avoid seedy toe.

V. Pricking from Nails.

Causes.—Pricking may come from a nail running into the quick when shoeing, or a nail may be picked up in the street. It is often done by the horse stepping on a piece of board containing a nail, and the nail is often pulled right out again when he steps off the board, or the nail may be broken off inside.

How to know it.—Sudden lameness will tell you that something serious is wrong. Pull off the shoe and examine the foot carefully. If one of the shoe-nails has punctured the quick, it will be moist and black. If a nail is found anywhere in the foot, pull it out carefully, so as not to break it off. If it *should* be broken off, pare away the hoof around it, and get hold of it with nippers and pull it out.

The lameness will be greater or less, according to the amount of injury done; if the nail wounds the tendon, that plays over the navicular joint in the foot, or pierces the navicular joint, the lameness will be very great, long continued and sometimes permanent. In many of these cases there is high fever, great pain, restlessness, blowing, redness of eyes, and the horse will not lie down. He will paw or continuously raise the foot. There will be loss of appetite in some cases, and not in others; the flanks will be tucked up, and every evidence of intense pain will be shown, especially if the wound is in the hind foot, and more especially if the navicular joint is punctured. In that case there will be a discharge of joint oil, a yellowish watery matter, which clots like blood soon after running out. When dressing it, you will find clots of yellow-



PRICKING FROM NAILS.

Showing the shoe partly pulled off and nails pricking the foot when the weight comes down.

ish, amber-colored matter on the poultice. In bad cases the leg swells, sometimes to the body. Great heat is in the foot and leg, and pain is shown if the foot is tapped. There will also be a hard, hot swelling in the hollow of the pastern and around the heels, with great tenderness to the touch.

All these symptoms will be noticed to a greater or less extent, according to the amount of injury done. Cases in which the nail does not wound the joint are usually simple.

What to do.—When you have removed the shoe, and found where the prick is, pare out the hole, and around it a little, to thin the hoof; this will relieve the pressure when it begins to swell. Then turn in a small quantity of solution of carbolic acid, one part of acid to twenty of water, or use a little turpentine. Either will tend to prevent suppuration. Then put the foot into a boot, or bag of linseed meal poultice. Change it once a day and examine the wound each time, to see that any matter that forms can escape. This is very important.

THE SOLE OF A FOOT.

Showing nail wound and and how to pare it out.

If it is a mild case, it will get well soon and the lameness disappear, when the horse can be shod and go to work. But if it is a bad case, and much matter forms, it will extend under the hoof and spread. In order to prevent this it is best to remove that part of the hoof which has matter under it. The same rule applies to the frog; sometimes the matter works under the entire frog, and it has to come off, but a new one forms readily.

A hot poultice is best, except when there is an open joint, then put on a cold one instead. At every dressing apply the carbolic lotion, and poultice right over it.

If proud flesh comes up, keep it down with powdered blue vitriol, applied once a day; if it comes up suddenly, as large as your thumb, you can cut it off with perfect safety. Then, when it stops bleeding, dress it with the vitriol. As soon as there is no more matter, and the lameness is nearly gone, leave off the poultice and dress it once a day with pine tar.

If the joint is opened, in addition to the treatment given above spread over the injured part of the foot, and also in the hollow of the pastern, Solid Extract of Belladonna, a piece as large as your little finger-nail, once a day and let the poultice go on cold, right over it. Continue this as long as there is much lameness. If there is much fever, give Tincture of Aconite Root in ten-drop doses, in a table-spoonful of cold water every two hours until the horse is better.

No change need be made in the shoeing, except to stuff tar and tow over the nail-hole, under the shoe. If nail wounds are neglected lock jaw is very apt to follow.

VI. Acute Founder or Laminitis.

Founder is of two kinds, acute and chronic. It is acute where, when it first takes place, all the symptoms are aggravated and the disease is attended with more or less fever. It is chronic when it has been of long standing and the diseased condition has taken an organized form, will remain as it is and become a part of the organized system, but is not attended by any fever, other than a slight local heat.

The inner surface of the wall of the hoof has horny leaves or laminae, very fine and near together, running up and down. On the outer surface of the bone of the foot are sensitive, fleshy leaves that dovetail, as it were, into the leaves on the wall of the hoof. On these leaves is borne the weight of the entire body.

Causes.—Sometimes it is caused by overwork, in which the feet are pounded, and sored up, causing inflammation in the leaves. But founder is usually a metastatic disease—one that originates in some other part of the body and goes to the feet by a peculiar transference called metastasis. It may originate in congestion of the lungs, pleurisy, inflammation of the bowels or peritoneum (the membrane holding the bowels in place) or in almost any part of the body. Drinking cold water when warm, or standing in a draft when heated will cause it.

FOOT WITH A WEAK SOLE.

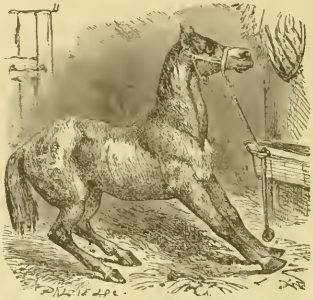
How to know it.—The acute form is easily recognized by the horse being in great pain, persistently standing in one place, as if riveted there, it being almost impossible to move him an inch in any direction, especially backward. He absolutely cannot back, but will hang the body back, throwing most of the weight on the hind legs, and stretching the fore legs as far forward as possible. If the animal tries to lift a foot it fails and acts as though the foot were fastened to the floor.

Predisposed to founder and pumiced foot.

The pulse is quickened, temperature raised, the mucous membranes become red and injected; the breathing is quickened as though there were some lung trouble; sweating is profuse, he will not lie down, and the appetite is lost for the time. The characteristic symptom is the inability to back; if you try to force the animal to back, it will swing the body back, without moving the feet. When thoroughly exhausted from standing, the horse will drop down, and will lie much of the time afterwards.

The inflammation in the bones of the hoof is followed by an effusion of water which severs the connection between the leaves by maceration,

letting the toe of the foot drop down, forming pumiced foot, if it is not promptly treated. Pumiced foot is incurable.

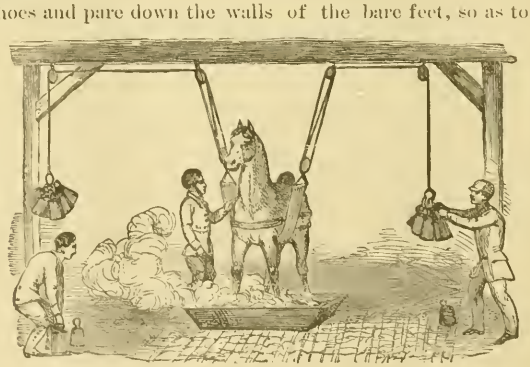


POSITION TAKEN IN ACUTE FOUNDER.

Sometimes the inflammation goes on to suppuration. Matter forms and extends around the hoofs, often causing them to drop off, which will take place in the course of three to six weeks.

Acute founder is often fatal by the excessive fever, by the absorption of pus into the system, causing pyemia, or by the extreme weakness that follows a long, lingering case.

What to do.—Give a dose of Raw Linseed Oil, one Pint, then pull off all the shoes and pare down the walls of the bare feet, so as to let him



A CONVENIENT WAY OF SOAKING THE FEET IN HOT WATER IN CASE OF FOUNDER.

stand on the sole and frog. If the feet cannot be raised to remove the shoes, lay him down and then remove them. Then, if standing, put him into a hot foot bath all around, one or two feet at a time. Let the water

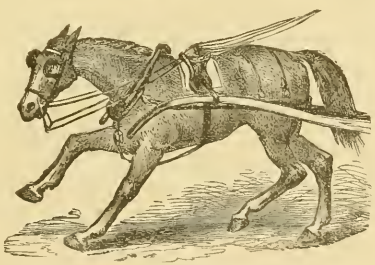
be hot for each one, and with a little mustard in it. Bathe the legs with it as high as the knees and hocks. Leave them in as long as the water remains hot; then take them out and put each foot into a linseed poultice, hot and soft, and bandage the legs with flannel. Repeat this morning and night for two or three weeks, or until the soreness is nearly all gone from the feet. Then stand him in a clay puddle, daytimes, and take him out of nights, and continue this as long as there is any stiffness. It will need to be continued, in most cases, for a month or more. Leave the shoes off till he is ready to work again. As soon as the feet are well put into poultices, begin on the following mixture:

No 4. 1 Ounce sweet spirits of nitre,
1 Drachm tr. aconite root,
1 Ounce potash nitrate,
½ Pint water,
Mix.

Give a tablespoonful every two hours, until the fever abates and the patient becomes comfortable; then drop off to three times a day. Continue this for about a week, or in a very bad case, ten days. Feed lightly on warm mashes, scalded oats, grass, &c.

VII. Chronic Founder or Laminitis.

How to know it.—The chronic form is a modification of the acute. In bad cases you will notice the difficult backing; lameness; pointing of the feet, first one and then the other; the horse goes with a short, shambling gait, as though the legs were all stiff, and the shoulders are



THE MOVEMENT OF A HORSE SUFFERING FROM SUB-ACUTE OR CHRONIC FOUNDER.

thrown forward, giving the chest the appearance of being drawn in. Hence the mistake some make, in supposing the horse to be chest-foundered. There is no such thing, it is always in the feet.

The shoes will be worn off more at the heels, and when pointing them he will extend the feet and rest them on the heel, turning the toes up as much as possible, because the trouble nearly all lies in the toes.

A DEFORMED HOOF.

With rings indicating sub-acute or chronic founder.

Horses with chronic founder will choose the soft parts of the road, but will avoid the water and mud holes as much as possible. In feeling of the feet you will notice them very hot nearly all the time, and there will be rings on the hoofs, from uneven growth of horn. The feet will very soon become much contracted and the hoofs brittle.

What to do.—You cannot do anything to cure it, but it can be alleviated by keeping the feet as cool and soft as possible with poultices, clay puddles and foot baths.

In addition, rub a little fly blister around the coronets once a month, and reset the shoes often.

VIII. Pumiced Feet.

Causes.—When the inflammation in the feet, from acute laminitis, is neglected, or allowed to run on several days before the proper treatment is applied, the connection between the sensible and insensible laminae, or leaves, is destroyed by the effusion that accumulates between them and soaks them apart, letting the toe of the bone tip on to the sole, pushing it down to the ground, or nearly so, and making the lower surface convex instead of concave, as it should be. Sometimes the toe of the bone will be punched quite through.

How to know it.—Take up the foot, and instead of seeing a nice, cup-shaped sole, you will find it bulged down towards the ground, making it oval the wrong way. If the bone is punching through, you will notice it, and it will leave no doubt in your mind as to what it is. The horse will be lame with all the characteristic symptoms of chronic founder.

What to do.—Nothing can be done to cure it, but if it is not very bad, careful shoeing, to keep all pressure off the sole, by means of a shoe, well concaved on the bearing surface, will help to keep him on his feet; then, by keeping the feet as cool as possible, he can be made serviceable for easy work.

When the toe of the bone pushes through, he is of no more use, and might as well be destroyed, to mercifully put him out of his misery.

CHAPTER III.

FEET OF THE HORSE AND THEIR DISEASES, CONTINUED.

I. THRUSH.——II. NAVICULAR DISEASE.——III. CONTRACTION OF THE FOOT.——IV. GRAVEL.——V. CANKER.——VI. CALKS.——VII. FRACTURE OF THE BONE OF THE FOOT.——VIII. STONE BRUISES.——IX. SIDE BONE.

I. Thrush.

Thrush is the name given to a disease of the frog. It is a rotting or ulceration of the frog, and is attended with a very offensive, black, watery discharge. The frog rots completely off sometimes, and extends down in the cleft between the heels, to a depth of from half an inch to two inches.

Causes.—Uncleanliness, standing in a filthy stable, especially in their own excrement. The filth remaining in the foot a long time and excluding the air, sets up decay which runs into ulceration.

How to know it.—The ragged frog, offensive smell, black discharge, deep cleft between the heels, which causes them to drop in towards each other, making them look very much contracted, are evident signs. In bad cases the animal sometimes goes lame, but not in mild cases. Still, great harm results from neglecting it, on account of the injury to the shape of the foot.

What to do.—Trim off all the ragged parts of the frog, clean out all the holes and crevices with a case knife, or some similar instrument, then apply a linseed poultice, with charcoal powdered over the surface. After twenty-four hours clean it all off, and dress the affected parts with calomel well introduced into all the cracks, with the case knife. Repeat this once or twice, letting a day intervene between the applications. When it is all dried up, dress the part with pine tar.

Prevention.—Pick out the feet well, each day, to let the air in around the frog, which is necessary to keep them healthy.

II. Navicular Disease.

One of the tendons of the leg (*the flexor pedis perforans*) passes down the back of the leg to the foot, and around beneath the navicular bone and joint of the foot, that lies directly above the frog. The tendon, passing between the bone and the frog, attaches itself to a rough hollow on the sole of the coffin bone. Disease in that part of the tendon, bone or joint is navicular disease.

The tendon is inflamed, sore and swolen; the inflammation extends to the joint and from that to the bone, which becomes rough and porous from having its fatty portion absorbed. The edge sometimes gets so sharp and rough as to saw through the tendon. This will let the fetlock down onto the ground, and the toe will turn up.

Causes.—It is caused by a very severe sprain of the tendon in its lower portion; any severe bruise on the frog or heels; the prick of a nail entering the foot far enough to wound the tendon or joint; or it might be caused by great contraction, the hoof pressing on the ends of the navicular bone, interrupting nutrition, thereby setting up disease.

How to know it.—There will be lameness of a peculiar kind. In the earlier stages the horse will go out quite lame, from a dryness of the joint, but will improve as he goes farther, though not so as to go sound: for the tendon being injured it would be impossible for the lameness to disappear altogether with exercise. He will wear the shoes most at the toes, will point the feet when standing, alternating them if both are affected, and rest them on the toes.

As the disease progresses, the gait becomes short, and the horse is liable to stumble, going too much on his toes, forming lameness known as groggy lameness.

Upon pressure of the thumb down into the hollow of the pastern, between the heels, tenderness will be noticed, and usually some swelling; the hollow will be filled up, and the pastern will be straightened up, nearer the perpendicular than is natural, and the knees will soon begin to go over.

What to do.—When the first symptoms are noticed, viz: slight lameness, with inclination to stumble, going out a little lame and soon warming out of it, tenderness to pressure in the hollow of the pastern and to tapping on the frog and heels, take off the shoes, pare out the feet well, open the heels, reduce the frog a little, and put on a wide-webbed, open shoe with the heels raised half an inch, to take off the bearing from the heels and frog, and to relieve the tension on the tendon. Then put the foot into a hot, soft, linseed poultice; change it once a day, and continue it right along for a couple of weeks.

If matter should show itself anywhere, you may be sure you have made a mistake in the disease. The matter must come from a nail or a corn, for matter never shows itself in navicular disease. Trace the pus, if any, to its origin, and treat it as prescribed for Pricks from Nails, and Corns.

After ten days or a fortnight, if the horse is better, take off the poultice and apply a fly blister to the hollow of the pastern, if it is swollen;

if not, let it alone. After the blister has been on for twelve hours, smear fresh lard over it. Continue this once a day, till the scabs come off; then turn him out to grass, with the shoe on, but reset it once a month, with the same directions carried out as given above.

If it is impracticable to turn to grass, keep the foot soft for a couple of months, by soaking in a foot-bath, or poultice-boots occasionally. He had better not be worked or driven during this treatment. Even after you think he is well, the high heel had better be continued for a couple of months.

If this does not cure, the next thing to be done is to have a frog seton inserted. This requires the skill of a qualified veterinary surgeon, and the foot must be kept in a poultice boot six weeks. A long rest and proper shoeing afterwards will also be necessary.

In all chronic cases, or those that will not yield to treatment, all there remains to be done, is to perform neurotomy. This also requires the skill of the surgeon; it never should be done, except as a last resort, and when the horse is useless from incurable lameness, from this or any other disease in the feet.

DIAGRAM.

Showing the course of the nerve that is severed in neurotomy. *a* is the nerve leading to frog.

III. Contraction of the Foot.

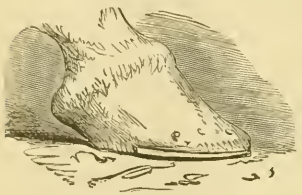
Causes.—Contraction is thought by many to be an original disease, coming on without any departure from a healthy foot previously; but this is a mistake, except in very rare instances. It is nearly always the effect of some other disease, especially when bad. Contraction accompanies navicular disease, corns, founder, sprains of the tendons, ligaments and muscles of the leg or shoulder. Any long-standing lameness, of the foot or leg, is always accompanied by contraction of that foot from the continual rest it gets in being favored every time the horse stops; when standing, he always points that foot, and rests it till compelled to start again. At the same time, the healthy foot expands on account of getting more than its share of the work; so it is only a question of a short time for the feet to become very uneven, one small and the other large; and they will no longer be mates. When you see this condition you may look for chronic lameness; it is most likely to be in the feet, either navicular disease, or chronic founder.

But contraction, to a certain extent, is the inevitable result of shoeing. A colt's foot, before being shod, is large, round and open-heeled, the quarters spread out like wings, and the whole foot on the under side has

the appearance of a large saucer. In shoeing, the quarters have to be narrowed more than the toe, because they are spread more, and in their expanded condition cannot bear weight on a shoe; the toe gets broken and worn off, while running, so it never spreads to the same extent as the quarters.

The cause of the colt's foot being so round and open is, that he has run on the turf without shoes, the feet have gathered so much moisture, been kept so soft, stepping on the earth or into the mud, that they act like a sponge, being compressed when stepped on, and expanding as soon as the weight is relieved, so that the hoof spreads a little every time the foot is raised. Another reason is, the foot being in moisture nearly all the time, the hoof grows faster, and extra fast growth is inclined to spreading, whereas a slow growth is inclined to contraction; and as soon as the colt is shod and put to work the slower growth of the hoof begins, and with it contraction.

Good shoeing will do a great deal towards preventing contraction and keeping the feet in good condition; and bad shoeing will ruin a foot in very little time.



SHOE LEFT ON TOO LONG.

Causing the hoof to grow over the shoe at the quarters, and to contract.

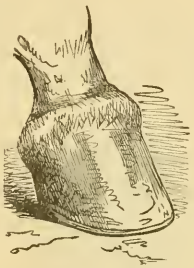
There is no more prolific cause than leaving the shoes on six, eight or twelve weeks without being reset, for the shoe, being nailed to the hoof, compels it to grow down in the form prescribed by the shoe. And when it is removed, and the hoof pared down to its natural size, you will find the heels very much contracted. Another common cause is standing on hard floors, allowing the feet to become all dried up.

What to do.—When there is no other disease in the foot, and contraction comes from bad or neglected shoeing, pull off the shoes, pare the feet down liberally, so as to be able to press the sole with the thumb, open the heels right up to the soft parts, rasp off the quarters quite thin, leave the frog as large as possible, in fact do not touch it at all. Then rub in a little fly blister to the coronet, smear the quarters with hoof ointment once a day, and turn out to pasture on soft ground. If you do not wish to turn the horse out, the shoes may be put on again; in doing so, let them be plain shoes with no calks, medium weight, perfectly level on the bearing surface, and beveled off to avoid bearing on the sole. Reduce the quarters so as to relieve them of any bearing on the shoe,

and let the frog come right down to the ground. Set the shoes once every three or four weeks, and repeat the above treatment each time, and in the course of three or four months, you will have a decent foot. There are several methods of spreading the heels by force, but in the long run they are all impracticable, and cannot be recommended. In addition to the above treatment, the feet may be packed with any soft packing, or a wet sponge held to the sole by any one of the many devices for that purpose; or the horse may be stood in a soak tub of either hot or cold water a couple of hours in the forenoon, and the same in the afternoon; or stand him in a clay puddle, as prescribed for founder.

A LOW HEELED, FLAT FOOT.

Seldom afflicted with contraction



A STRONG, UPRIGHT, HIGH HEELED FOOT.

Predisposed to contraction.

IV. Gravel.

Causes.—Gravel is apt to work up into a sore of any kind in the foot, and cause great pain, irritation and lameness. It often gets into a corn, or into a nail hole, made either by a prick in shoeing, or by a nail picked up in the road. It may get into a quarter crack, calk, or any wound whatever, and always causes an increased inflammation, and aggravates any existing difficulty.

How to know it.—Examine the wound carefully, to avoid pushing the gravel farther in. It will be readily detected by feeling hard, grating grains in the wound, or by the dirty appearance of the wound itself; it will look black and unhealthy.

If neglected, it will work up through and break out at the top, forming a quittor. It sometimes gets into a crack that forms between the wall of the quarter and the sole, either from the sole shrinking away from the wall, or the wall being broken away from the sole.

What to do.—Trim the hoof away around the opening, so as to have plenty of room, then wash it out, rinse it out with a syringe, by shooting

the water into the hole with some force; then dig it all out carefully, and inject into it carbolic lotion:

No. 5. 1 Part carbolic acid,
30 Parts water.
Mix.

Then apply a poultice, hot and soft. Repeat this once a day till the hole is filled up with sound, healthy flesh. Then apply the treatment prescribed for corns.

V. Canker.

When any extensive disease of the feet necessitates the exposure of much of the soft structures, instead of the flesh becoming nicely covered with hoof, and coming out smooth, it sometimes sprouts up into a shreddy, leathery substance, that will not grow together and form hoof, but remains spongy, enlarged, soft and tender.

CANKER OF THE SOLE.

The horny sole being removed.

CANKER OF THE FROG.

The horn laid back to show the diseased parts.

Causes.—Neglected or badly treated wounds, they being also affected by the air in which the horse is kept during the healing of them; low, damp, dirty stables, without drainage or ventilation; and the horse standing in his own excrement during their treatment.

It is more common among draft horses and those of a phlegmatic nature.

How to know it.—By the uneven surface, growing up in leaves that extend down, sometimes from a half to three quarters of an inch.

What to do.—Bad cases are usually considered incurable; when such exist, the foot never can be made to grow into a fine, solid hoof. But in most cases the disease will yield to proper treatment.

Pare away all you can without bleeding it; then dress it with powdered blue vitriol. Keep the sole and all diseased portions dry; this is most important, as moisture prevents a solid growth, and promotes a fungous growth. If any pus comes out between the leaves, insert, well down into

the hole, a stick of lunar caustic. Dress it in this way once a day till the leaves are all reduced to a solid surface, then, if it is raw flesh, and not too prominent, apply burnt alum or air-slacked lime, alternating them occasionally with the vitriol. Keep the sore part perfectly dry all the time.

When it is well started, and good quality of hoof is growing, dress it with pine tar and tow. The horse may be shod as soon as it is well enough to be dressed with the tar; before that time the shoe is better off, the foot being in a canvas bag and the horse running in a box stall.

VI. Calks.

Causes.—Calks are cuts and bruises on the coronet, or soft parts above it, caused by one foot stepping upon the other, and the calk of the shoe, if sharp, cuts into the flesh. It is most common in fall, winter and spring, when mud and snow are deep; the horse getting stuck is almost sure to step on his own feet.

CALKS OR TREADS ON THE CORONET.

What to do.—If the wound is in the skin, and of any length beyond one inch, take a stitch in it, or more if needed. Put the stitches half an inch apart, first clipping off the hair along the edges of the wound. If any artery is cut, so as to bleed a stream, put a dry sponge over it and bandage with a coarse cotton bandage, tight; leave it on ten or twelve hours, then remove and dress with the carbolic lotion:

No. 6. ½ Ounce carbolic acid.
1 Pint water.
Mix.

Sop it on and bandage just tight enough to keep the parts in their proper position. Remove the bandage twice a day, wash the wound with warm water and castile soap, and dress with the above lotion.

When the edges are united, or if the stitches tear out, which they are very apt to do, and expose a raw surface, apply the White lotion:

No. 7. 6 Drachms sulphate of zinc.
1 Ounce sugar of lead.
1 Pint water.
Mix and shake.

Dress the wound with this three times a day, washing it as often as necessary to keep it clear of pus. If the wound is inclined to gape open, continue the bandage a few days.

If the calk is in the coronet, running down under the hoof, it will fester, and pus will accumulate and cause great lameness; the part will swell, and will be red, hot and tender to the touch; the lameness being so great in some cases as to prevent the animal putting the foot to the ground at all.

Pare away all ragged edges, and as much of the hoof, following the sore down, as confines any pus; remove any hair or other foreign matter that may have got into it; then apply a poultice, after dressing with the carbolic lotion, No. 6. Change the poultice twice a day, using the carbolic lotion each time, and examine the wound carefully to ascertain if there is a sack or pocket containing pus below where it is pared out. The hoof needs to be reduced to the bottom of the wound and kept so. Continue the poultice until the hole fills up, and the lameness is nearly or quite gone; then discontinue the poultice and dress three times a day with the White lotion, No. 7.

Lay the horse up till the wound is well enough not to be injured by sand getting into it. If any proud flesh springs up, burn it down with burnt alum.

When the hoof is growing down, apply a mild blister of flies to the coronet, and trim the new growth from time to time to keep it smooth.

The flesh which fills up the hole in the hoof must be kept down even with the deep edge of the old hoof, otherwise the edges press against the flesh and prevent it from healing.

VII. Fracture of the Bone of the Foot.

Causes.—This does not occur very often, but we see it occasionally. It is caused by striking the foot with great force against any hard substance, especially if the foot receives the blow on the quarter. The bone of the foot may also be fractured by being run over with a loaded wagon; or by being stepped on by a heavy horse, the foot coming on the top of the hoof in front breaks the pyramidal process, (the point rising from the center of the coffin bone.)

How to Know it.—Extreme lameness comes on suddenly, soon after the accident, and increases with time. The foot swells around the coronet, and is very tender, and the horse will not put any weight on it at all.

What to do.—Remove the shoe and ascertain, if possible, the location of the injury by pressure, tapping and pinching; then pare or file away

the hoof over the spot, so as to give it a chance to swell and relieve the pressure. Put the foot into a poultice; change it once a day, and relieve the pain as much as possible by paring away all the hoof you can over and around the part; it will grow again long before the horse is fit to work. If any hole forms for the escape of the pus, you may be sure there is a broken piece of bone that is acting as an irritant, and must be removed. Follow down the hole, paring away the hoof as much as is necessary to remove all detached pieces, for every piece that is separated from the main body will have to come out.

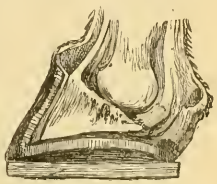


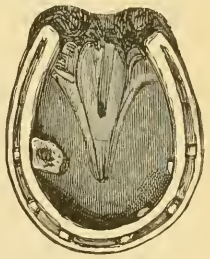
DIAGRAM OF FOOT.

Showing the position of the coffin bone, which is often fractured.

When all the pieces are removed, dress with the carbolic lotion, No. 6, twice a day, letting the poultice come over it until the discharge is stopped, and the hole filled up with flesh. Then dress it with the White lotion, No. 7, three times a day. Trim the new hoof as it grows to make it grow down as evenly as possible. When sufficiently healed to be safe to turn him out, do so, and let him run two or three months. In most cases the wound will fill up and heal with very little trouble, and the foot will be nearly as good as before.

VIII. Stone Bruises.

Causes.—Bruises are often found on the feet, especially around the heels. They are usually caused by stepping on round or pointed stones, or other hard substance. Sometimes they are slight and get well without any treatment other than a day or two of rest. But sometimes they result seriously, when the bruise is so deep that suppuration takes place, and is liable to spread or work up through and break out at the top, like a corn. Sometimes the bruise is so severe as to destroy the life of the soft parts underneath, causing them to slough out bodily as soon as the hoof over the spot is removed, leaving a hole large enough to put your finger into. Sometimes it comes by a very hard blow on the heel of the shoe, which bruises the quarter, and all of its attachments, from the bone, so that a core as large as the end of your thumb sloughs off the wing of the coffin bone. When the injury is so great it must be promptly treated, or it will break out at the top and form a quittor.



BOTTOM OF FOOT.

Showing a stone caught between the sole and shoe.

How to know it.—There will be lameness, according to the extent of the injury. Upon examination a tender spot is found on the sole or frog, or on one of the heels. Lameness increases from day to day. When the shoe is removed no nail hole is found, nor any discoloration denoting a corn; but the tender spot exists; it is not where tenderness from navicular disease would be found, therefore you come to the conclusion that it is a bruise.

What to do.—The shoe being removed, put the foot into a poultice for twenty-four hours. Then pare down on the bruised spot and liberate any pus that may have formed; if none is found without cutting too deep, replace the poultice and try again the next day. A pair of pinchers will help to locate the bruise by pinching all around the foot. If the tissue is bruised off the wing of the coffin bone, it will come out like a core when it is sufficiently rotted and the sole is cut away underneath; if it is not cut away the disease will go on and break out at the top of the hoof.

DIAGRAM OF A FOOT.

Showing position of wing of coffin bone, often badly bruised and sometimes fractured.

When the core is taken out, dress it with the carbolic lotion, No. 6, and replace the poultice. Continue this treatment till the hole is filled up with sound, healthy flesh. Then dry it up with poudered blue vitriol by applying it once a day; omitting the poultice and leaving the sole dry, but keep the foot cool and soft with swabs tied around the wall of the foot, and wet with cold water several times a day. When dry, dress with tar and tow and put on the shoe so as to protect the weak spot; do not have any bearing on that portion.

IX. Side Bone.

Side bone is a hardening of the lateral cartilages of the fore feet. These cartilages are situated in the quarters of the feet, one on each side, and are attached to the wings of the coffin bone. They extend above the quarters of the hoof, are covered only with the skin, and can be felt readily; they are found to be very pliable in health, but are perfectly solid in cases of side bone, being ossified. They are the result of inflammation in the lateral cartilages.

Causes.—Any severe injury to the quarter, by the horse stepping on his own feet, getting the foot caught under a root in a woody pasture, contraction of the heels setting up inflammation by undue pressure, quittor, very severe nail wounds, or severe bruising of the heels; and it often accompanies navicular disease.

How to know it.—The quarters are enlarged upwards from the hoof, are as hard as bone, and perfectly inelastic. In the early stage there will be heat, soreness, pain upon pressure, and lameness.

What to do.—When the quarters have been bruised or injured, in any way, foment with hot water in cold weather, and cold water in hot weather. Apply the water as continuously as possible, and wrap them in woolen cloths saturated with water between the times of bathing. When the soreness has left them, and there is no more lameness, discontinue the water treatment, and apply a fly blister over the spots. This will cause any remnants of inflammation to be absorbed. After they are once thoroughly hard they seldom or never cause any further lameness, but there will always be a clumsy, stiff action, due to a want of elasticity.

CHAPTER IV.

SHOEING AND CARE OF THE FEET.

I. WHAT A SHOER CAN DO.——II. HOW TO PREPARE THE FOOT FOR THE SHOE.——III. WHERE THE BEARING SHOULD REST.——IV. WEIGHT OF SHOES AND HOW TO FIT THEM.——V. CARE OF THE FEET IN THE STABLE.——VI. THE FLOOR OF THE STALL.

I. What a Shoer Can Do.

Horse shoeing is a trade in which a great deal of skill can be exhibited. A good shoer can keep the feet in the very best condition as far as shoeing is concerned, and a poor one can ruin a set of feet in a very short time.

II. How to Prepare the Foot for the Shoe.

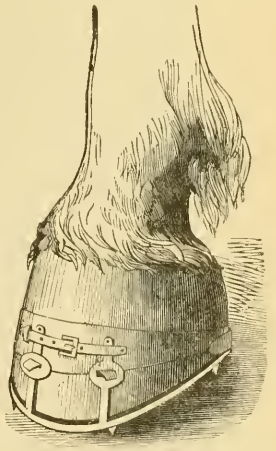
The foot should be carefully prepared by being rasped down to its proper size and all superfluous growth of wall and sole removed. To do this requires judgment, for there are scarcely two feet alike. Some grow faster than others; some are high-heeled and some low, some have thick soles and are very concave, while others have thin soles and are flat. Flat-footed horses have the latter, and the extreme in the other direction is seen in the club-foot. In flat feet the toes are long and thin and are spread out, the heels low and soles thin. In club-feet the toe is short, the wall straight, almost perpendicular, the heels high and strong, and the soles thick. The flat foot needs very little paring and is seldom afflicted with contraction, while the strong foot is very prone to contraction and needs considerable trimming to prepare it for the shoe. The flat foot is more subject to laminitis, bruises, pricking and gravel; the strong one to corns, quittor, contraction and navicular disease. Both the flat foot and the strong foot are objectionable; the medium is the best foot.

III. Where the Bearing Should Rest.

In paring the foot for the shoe, the wall wants to receive the most of the bearing, though the sole near the wall can take some of it. The heels ought to be lowered the least trifle to reduce their bearing, and should be opened about half way up to the hair in a V shaped manner to allow the foot to expand a little every time the weight comes on it, so as to avoid as much as possible the evil of contraction, which, as already stated, is the inevitable accompaniment, more or less, of shoeing in all cases. If there are any ragged edges on the frog, trim them off, otherwise the frog need not be touched.

IV. Weight of Shoes and How to Fit Them.

In making the shoe it should be perfectly level on the bearing surface, beveled off gently all around from about three-eighths of an inch from the outside to the inside, so as to avoid giving any bearing on the sole, and to facilitate the removal of any gravel that might work in between the shoe and sole. Let it be of good length, and of a weight to suit the horse; some require heavy and some light shoes. Fore shoes vary in weight from ten to twenty ounces; hind ones, from eight to twelve ounces. On the ground surface it is well to bevel towards the centre, thereby widening the web which protects the sole from bruises and pricking from nails. Let the toe be rounded off for driving horses to prevent stumbling, and give them as little calking as their work will allow. The driving horse is usually better on a plain shoe, while the draft horse needs calks to give him a purchase on the ground so as to pull heavy loads. The hind shoes are best with a small toe calk, and the heels raised by leaving the shoe a little thicker to level it up to the toe calk.



THE CRAMPON, TO PREVENT HORSES SLIPPING IN FROSTY WEATHER.

Shoeing for diseased feet, (pathalogical shoeing,) has been treated on in connection with the diseases of the feet in the two preceding chapters.

In finishing off a foot with the rasp, after shoeing, the wall should not be rasped above the nail clinches, as it destroys the oily, unctious covering that is there to keep the fibers tough and pliable, and prevent sand crack.

V. Care of the Feet in the Stable.

A PLAIN SHOE.
With large, sharp-headed nails for winter use.

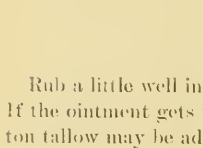
Care of the feet in the stable has a great influence on their health. Horses that are kept on floors and pavements continually, and even country horses in dry weather, should have the feet either soaked out in a foot bath or clay puddle, or packed with moist sponge or oil-cake meal two or three times a week. If it is not done, they dry and contract from want of moisture, get brittle, and have sand and quarter cracks, and lose nearly all toughness. When the hoof is brittle and inclined to crack, in addition to the above, a hoof ointment, made and applied as follows is beneficial:

No. 8. 4 Fluid ounces pine tar,
4 Fluid ounces whale oil,
Mix.

Rub a little well into the coronet and upper part of the hoof once a day. If the ointment gets too thin in warm weather, a couple of ounces of mutton tallow may be added to give it a better consistency.

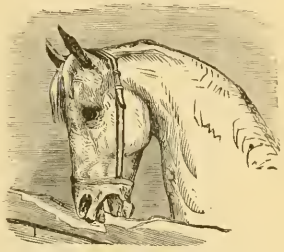
VI. The Floor of the Stall.

Confinement to the stable, even under the most favorable circumstances, has a tendency to produce diseases of the feet, such as are comparatively rare among farm horses which enjoy constant exercise at work or running in the pasture. The anatomy of the horse's foot is such that exercise is absolutely necessary to keep up the circulation of blood under the hoof, and the bad effects of inaction are only aggravated by requiring the animal to stand on an unnecessarily hard surface. The confined horse endeavors to supply the lack of outdoor exercise by stamping and pawing, and should have a soft surface of earth or sawdust to paw upon. Pawing and stamping serve the specific purpose of keeping the blood moving under the hoof: crib-biting on the other hand is often merely an exhibition of the restlessness an active animal feels at being cooped up.

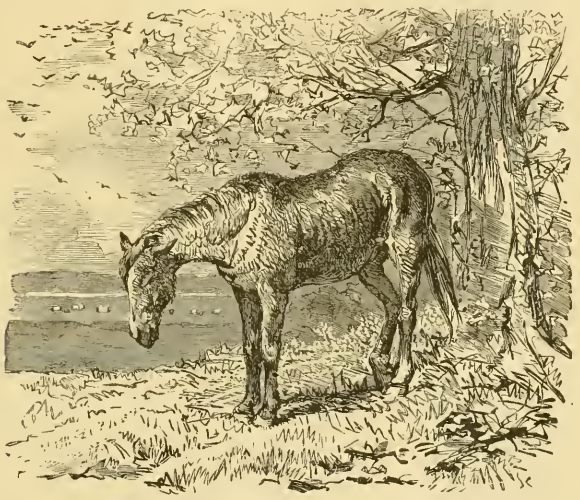


VEINS OF THE HORSE'S FOOT.
The network of veins without valves situated immediately under the secretive membrane of the hoof.

In constructing the floor of the stall the health and comfort of its occupant will also be promoted, if care is taken to avoid having his fore feet rest upon a higher level than his hind feet. The opposite practice, that of building the stall floor to slope from the manger backwards, is too often resorted to for the purpose of securing surface drainage; but it is a blunder to do this. When in the open field and free to choose his ground, the horse will select for rest a gentle slope on which he will stand with his fore feet resting on a lower level than that occupied by his hind feet. It is the position in which there is least strain upon the back muscles of the foot and leg while standing—the one in which the horse rests easiest.



CRIB BITING.



RESTING WITH THE HIND FEET HIGHER THAN THE FORE FEET.

CHAPTER V.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES.

I. BONE SPAVIN.——II. BOG SPAVIN.——III. OCCULT SPAVIN.——IV. BLOOD SPAVIN.——V. THOROUGHPIN.——VI. CURB.——VII. RING BONE.——VIII. SPLINT.——IX. SPRAIN OF BACK TENDONS OF THE FORE LEGS.——X. BROKEN DOWN.

1. Bone Spavin.

Spavin is an arbitrary name given to disease of the hock joint, in which inflammation is an early symptom. Effusion follows it, and ossification of the exudate forms a bony lump on the joint, usually on the inner side near the front, but it may occur on any part of the joint. It always affects the joints more or less and causes great lameness, which is usually susceptible of a cure, but sometimes defies treatment, and permanent lameness is the result.

The hock joint is composed of a *true hock joint* that works like a hinge, and three flat gliding joints below it before we come to the cannon bone, and on each side of the cannon is a splint bone the same as in the fore leg. The connection between the splint and cannon bones is ligamentous. The spavin usually takes its origin between the cannon and the inner splint bone, and extends up to the joint and around it, and sometimes involving the whole hock, except the true hock joint, stiffening it and interfering with the action very seriously.

BONE SPAVIN.

Showing the bony tumor on the inner side of the hock joint

Causes.—It is often caused by a sprain of the ligamentous connection between the cannon and inner splint. Sometimes the sprain may affect the ligamentous connection between the cannon and the outer splint, but usually it is on the inner side, on account of the line of the center of gravity being more to the inside, bringing more weight to the inside than to the outside. It is sometimes caused by a bruising of the joint itself by kicking, jumping, running, pulling heavy loads up hill, bringing great strain on the hind legs; by slipping when the weight is on that leg; by blows, kicks from other horses; by getting cast in the stall. In fact anything that seriously injures the joint, may run on and form a bone spavin.

POSITION TO TAKE WHEN FEELING FOR A SPAVIN.

How to know it.—In the early stage there will be lameness, more or less acute, according to the amount of injury to the joint. The lameness will be distinguished by a stiffness in moving from side to side in the stall, by backing out and going off on the toe of the foot for a few steps, but soon improving with exercise till he will go all right after having gone a few steps, and remains so till stopped and allowed to cool off, when he will go off worse than ever, until warmed up again. The cause of this

Position of a foot that cannot be raised from the ground by reason of spavin.

Position of a healthy foot raised from the ground in an easy trot.

is: By standing the joint becomes dry, and great pain attends the flexion of it, but the exercise excites the secretion of synovia, (joint oil) which lubricates it, and the horse is comfortable till the joint gets dry again.

Upon pressure, a soreness and heat will be found, usually just at the bottom of the joint on the inside, but well to the front. A slight amount of swelling may be noticed, but not much until the *second stage* is reached, when a hard, bony enlargement will spring up and extend more or less, sometimes only involving the splint, cannon and the first bone of the gliding joint. But at other times it extends clear around and involves all the gliding joints, the calois and cuboid parts of the joint, and it leaves bony deposit around the tendons between the splint bones at the back of the hock. The enlargement is best seen by standing at the side of the horse, about a yard from the shoulder, when, instead of the smooth, straight declination of the inside of the hock, you will detect the lump just above the end of the cannon. Sometimes the lump is farther back; then it can be seen better by stooping down in front, and looking between the fore legs. Occasionally it will be seen only on the back part of the hock; then it usually escapes detection even by experts.

What to do.—If taken when it is in the first stage, before any effusion is thrown out, it can be cured by treating vigorously to remove the inflammation. This is best done by continuous applications of hot water

or poultices; raise the heels of the foot about an inch and give absolute rest till all lameness and soreness are gone. Then turn him out to grass or straw yard for three or four months.

But if the spavin runs on to the second stage, in which effusion is thrown out and ossification is begun, a good smart blister, well rubbed in after the soreness is taken out by the hot applications, will perform good work in some instances. If it is not improved by the first application repeat it. The blister is made as follows:

No. 9. ½ Ounce powdered cantharides,
2 Ounces lard,
Mix.

Also prepare

No. 10. 2 Drachms red iodide of mercury,
2 Ounces lard,
Mix.

Mix the two blisters together and rub it well in, first cutting off the hair. After twelve hours, smear fresh lard over the place. Repeat the lard once a day till the scabs are all off and the skin is nearly healed; then repeat the blister, and so on till he is cured. This treatment is effectual if begun in time and vigorously applied, and sufficient rest given afterwards. It may absorb nearly all of the enlargements. If this fails, or if the case is allowed to run on to the third or confirmed stage, in which the lump has become thoroughly ossified and the gliding joints more or less incurably affected, the only hope of doing anything to any advantage is to produce anchylosis (stiffness) of the joint. For when the articular surface of the joint is much affected it cannot be cured and restored to soundness, so the only thing to do is to stop the lameness. The most effectual way to do this is to apply the actual cautery (firing iron), which produces so great an amount of artificial inflammation, causes such an increased flow of nutrition to the part, that, when accompanied by rest, it destroys the joints that are affected, by stiffening them. There are several ways of applying the firing iron, but the most common is to pass the iron, with a dull edge, over the part affected, in lines running obliquely each way, forwards and backwards, from a centre line drawn perpendicularly from about the centre of the hock on the inside to a point on the cannon about an inch and a half below the hock. Draw similar lines on the front and back of the hock, and then draw the oblique lines from one to the other, giving it a feathered appearance. In bad cases it is advisable to fire on the outside of the hock, too, as a surer means of removing the lameness, but, on account of the iron leaving scars wherever it touches, this outside application is usually objected to, unless the first firing fails and it has to be repeated; then it should always be carried clear around. It is the opinion of some authorities that every case can be cured of lameness by repeating the firing, if necessary, half a dozen

times, but it is accepted as a fact, by most surgeons, that when the articular ends of the bones are ulcerated there will be permanent lameness.

Apply the blister, No. 9, well rubbed in with the hand, immediately after firing. Some operators delay the blister till next day, but it is preferable to rub it in before the leg gets sore and swollen from the firing. Tie up the horse's head for twelve hours to prevent him biting it. After twelve hours, grease over, and repeat the application once a day till pus begins to form under the scabs; then wash it once a day with warm water and soap to prevent blemishing by the pus burrowing under the scabs. When dry, rub the grease in. Give him absolute rest in the stable for four weeks; then give him a three or four months' run at grass; and when beginning to work again, let it be gently for some time. While this treatment is going on, it is advisable to have a high-heeled shoe on the foot of the lame leg; let it be raised an inch. When shoeing, after he is well, continue the high calks for a month or two.

There are numerous patented spavin cures in the market, some of which have more or less merit; but as a rule, the above is the only reliable treatment. Some of the nostrums claim to be able to cure a spavin in twenty-four hours without breaking the skin, but they are humbugs of the worst kind. Sometimes very strong corrosive blisters are recommended, such as corrosive sublimate, etc., but they are cruel in the extreme and not as likely to cure as the treatment laid out above, which, being the most humane, although pretty severe, is the best to pursue. When firing, it is advisable to cast the horse to keep control of him and be able to perform a better operation, and the hair should be shaved off.

II. Bog Spavin.

This is the name given to an enlargement of the hock by distension of the synovial bursa. The synovial membrane of the joint becomes inflamed and secretes a superabundant amount of joint oil which distends the membrane and enlarges the joint sometimes to the size of a child's head. It can be alleviated by good treatment, but when once well-distended it can seldom be radically cured, and very many unfortunate animals carry the big joint with them to the bone yard.

Causes.—It is caused by severe sprain of the joint, the inflammation extending to the synovial membrane, and sometimes even to the joint. Sometimes the origin of it lies in the joint itself from severe bruising by concussion when jumping, kicking or being kicked. It is also caused by wounds from being stabbed with the fork by reckless grooms, or pricks from nails in the stall, when a restless horse demolishes it by kicking.

HOCK JOINT.
Showing the enlargement of Bog Spavin.

How to know it.—There will be a large, soft swelling on the inner and front aspect of the hock. The swelling is of the same character as wind galls; it seems to be filled with air, but

it is synovia. In mild cases there is little, and, sometimes, no lameness; but in bad cases there is lameness of a general character, stiffness in the hock, more pain evinced when starting than after a little exercise, heat, soreness upon pressure, and a tendency to get worse rather than better, even with treatment.

What to do.—Bathe it as continuously as possible with either hot or cold water for twelve hours, then apply an oil-meal poultice, hot and soft. Continue the poultice for several days, changing it once a day, and bathing with hot water at the time of changing. When the soreness and lameness are gone apply the following liniment twice a day:

No. 11.
3 Ounces tincture of iodine,
1 Ounce aqua ammonia,
1 Ounce turpentine,
1 Ounce glycerine,
Mix.

Rub well in with the hand till the skin is quite sore; then grease it once a day till it is healed, then repeat. Keep it pretty sore for a few weeks, giving perfect rest. Then turn the horse out for a long time.

Some recommend bandages, but they are not practical since they are very difficult to keep on and always chafe the skin above and below, necessitating their suspension from time to time to allow the skin to heal. Puncturing the sack is prescribed by some, but it is very dangerous and cannot be recommended.

III. Occult Spavin.

Occult spavin is similar to bone spavin in all respects, except that there is no enlargement, and no external evidence of any lesion whatever. The lameness is severe, persistent and of the same character as in bone spavin, the horse going off on the toe, working out of the lameness with exercise in the earlier stages, but the lameness is often permanent through all the subsequent stages.

Causes.—Severe concussion on the ends of the bones in the joint

How to know it.—There will be the characteristic bone spavin lameness, but the disease will show no outward marks. A very sure test is to drive the horse enough to warm him up and get the spavin to working well, then let him stand half an hour, then take the toe of the foot of the lame leg in your hand and raise it as high as possible so as to flex the hock joint. Hold it there two or three minutes, then drop it and rush the horse off on a smart trot. If it is spavin he will go off on three legs for a few steps, and bring the toe down first as he warms up again, and after a little will go all right until stopped and allowed to cool.

What to Do.—When it is satisfactorily located give it the same treatment prescribed for bone spavin.

IV. Blood Spavin.

Causes.—Blood spavin is a distension of the saphena major vein as it passes over the enlargement of bone spavin. The vein is constricted and the blood dammed up to a certain extent, causing a distension of the coats of the vein and giving the leg the appearance of having a very large bone spavin on it. It seldom does any harm.

How to know it.—Stand at the shoulder and view the hock as directed for bone spavin, and you will see the enlargement in the same position as the bone spavin.

What to do.—Upon examination with the hand, the enlargement will be found to be soft and readily rubbed down, which should be done often. This is the only treatment of any virtue.

V. Thoroughpin.

This is of the same nature as bog spavin (distension of the synovial bursa) but occurs between the os calcis, forming the point of the hock, and the rest of the joint. It seldom does any more harm than to form an eyesore. Lameness from it is very rare.

Causes.—It is produced by many of the same causes that are ascribed to bog spavin, though the principal cause is hard work, consequently it

ENLARGEMENT.

Forming thoroughpin.

DIAGRAM.

Showing dissection of thoroughpin and bog spavin; also the junction of the two affections.

is often seen in draft horses, hack horses, stage horses, and animals for general utility. It is also often seen on stallions that are used for serving mares, the strain thrown on the hind legs being very great. It is often seen in young growing colts when large and heavy for their age, owing to the immense weight brought upon young and tender joints.

How to know it.—Unsightly puffs are seen just in front of the point of the hock. They are soft and appear to be filled with air but it is synovial fluid that distends them. Thoroughpin usually accompanies bog spavin, but it may exist without the latter.

What to do.—When first seen, apply a cooling lotion, made as follows:

No. 12.
1 Ounce muriate of ammonia,
1 Ounce saltpetre,
1 Quart water,
Mix.

Bathe the part with hot water, rub dry and apply the lotion three times a day, giving absolute rest. Follow this up for a week, then, after bathing with the hot water, apply the liniment No. 11, well rubbed in, twice a day. When the part gets sore from the liniment, hold up a few days and grease the part with lard till nearly healed, then repeat. It cannot be permanently cured, for, when made to absorb by the treatment and rest, it will return with work.

In case of a young colt getting thoroughpin, shorten his allowance of feed a little for a couple of months, and the puffs will become absorbed.

VI. Curb.

Curb is an enlargement on the back of the hock and a little below. It is seen in the form of a bowed section about four inches in length; sometimes it is swollen up as thick as an inch from the healthy form, and sometimes the enlargement is so slight as to be hardly noticeable. When in the inflammatory stage the swellings cause lameness, but when once well hardened they seldom do. The seat of the injury lies in the calcaneo-cuboid ligament and others lying near it.

SICKLE OR COW HOCKS.
Most liable to curb.

That form of hock known as curby hock is most liable to it. The form that merits that name is curved from the foot to the stifle, extending backward outside of the perpendicular line drawn straight from the posterior point of the hip to the ground. It is sometimes called sickle or cow hock. On account of the curved outline of the leg there is a greatly increased strain on the back of the leg at the point of the greatest curvature. This is found at the hock, hence we frequently have curbs on such legs.

Causes.—A sprain of the ligaments of the back part of the hock, frequently produced during severe exertions in jumping, running, trotting, pulling heavy loads, etc.

How to know it.—Standing at the side of the horse, opposite the hind parts, and looking across the legs you will notice a curve on the back and lower portion of the hock, instead of a straight line, as there ought to be

in a healthy leg, from the point of the hock to the fetlock pad. In recent cases there is lameness, heat, soreness to the touch, and, like all sprains, it grows worse with exercise.

What to do.—In a recent case when the sprained tendons and ligaments are sore, swollen and hot, apply the cooling lotion, No. 12, bathing the part with hot water three or four times a day for half an hour at a time. Raise the heel an inch, continue this treatment till all soreness is gone, about a week or ten days, then apply the blister, Nos. 9 and 10, mixed. When the blister has taken well, grease it once a day for a few days till it is healed, then blister again. Give three or four weeks' rest. If this does not cure, or, if there is no improvement in two weeks, resort to the firing iron. Draw a line down the back of the leg, over the curb, and then draw lines obliquely to it in the form of a feather. The lines should be burnt about half way through the skin, but in no case burn clear through, for that would make a bad blemish. Rub the blister, No. 9, well in over the firing. Grease that the same as in the milder treatment, and wash it occasionally to remove scabs that may have pus underneath, which must be liberated. In old, chronic cases that have been neglected or have not yielded to other treatment, resort immediately to the firing iron, as recommended above.

Prevention.—Avoid breeding animals that have curby hocks, for they are very objectionable, and the form of the leg, in most cases, is transmitted.

VII. Ring Bone.

This is an exostosis (bony enlargement) on the pastern, around the upper or lower pastern joint. It usually runs clear around the leg in the form of a ring, hence its name. It usually forms around the upper pastern joint, but sometimes affects the lower one. In the latter case it is under the coronet, and is then worse, as it cannot be got at to be treated, and is more likely to cause permanent lameness from its extension to the navicular joint, involving it in the inflammation and anchylosis. When the ringbone comes under the coronet, it often grows so large and extends so much as to make a large, ugly, stiff, club-foot of the handsome, elastic pedal extremity of the horse, and gives rise to permanent lameness. But when it forms around the upper joint it does not usually grow very large, and is quite susceptible of treatment.

Sometimes the bony deposit is only in front or on one side, or on both sides and not in front, in either the upper or lower forms.

Causes.—A sprain, a blow on the bone from a kick, stumbling and striking it on a stone, stab from a fork tine, in fact, any severe injury setting up inflammation on or near the bone, is apt to result in a ringbone. For the nutritive material sent to the legs and feet is of a bony

character, that is, makes bone, so when an effusion is thrown out it becomes organized or forms part of the living system, and ossifies, the size of the deposit depending upon the extent of the inflammation. There is a theory among scientific men, that liability to throw out bony enlargements, especially around joints, is hereditary in the form of an *ossific diathesis*, which is borne out by actual experience in breeding: mares or stallions affected with spavin, ring-bone, splint, enlarged knees, etc., are apt to transmit them to the offspring. We frequently see foals two months old with ring-bones, and sometimes with spavins and curbs, making it very convenient for dealers to excuse their presence by saying the colt was foaled so, and that it never will hurt him. Which may be true enough in one sense, for the affected parts become solidly anchylosed, and as strong as any other part, and perhaps stronger, for the extra deposit acts as a support to the weak part; the part being naturally weak, inherited from one of the parents, the deposit is an effort of nature to strengthen it. Therefore, the practice of breeding from stallions or mares that are unsound from any bony deposit, except those caused by some known accident, is to be most emphatically condemned.

DIAGRAM.

Showing Pastern and Pedal Bone of a horse affected with Severe Ring-bone.
1. The joint between the pastern bones, showing the groove in which the tendon of the extensor pedis muscle reposes.
2. The joint between the lower pastern bone and the bone of the foot.

How to know it.—In the acute stage, (when it is beginning to grow) there will be lameness that works off with exercise; and also soreness, heat and swelling when examined carefully with the hand. When it has run on to the second stage, and become hardened into bone, it will be felt around the pastern joints in lumps, or in a ring running clear around the pastern. Or it may be spread over the surface of the bone as if plastered on.

Nature may effect a cure by anchylosing the joint, which will stop the lameness, but there will be a certain stiffness always; or ulceration of the heads of the bones may take place and cause permanent lameness. As long as it is in the stage in which the lameness works off with exercise, there is a chance of curing it by stiffening the joint. But when there is permanent lameness the chances of a cure are small, although it is best to try, and repeat the trial too.

FOOT OF A HORSE.

Affected with ringbone. The pastern joints being entirely stiffened.

What to do.—In the first stage apply hot baths, and follow them with the cooling lotion, No. 12, three or four times a day till all active inflammation is gone; then blister with Nos. 9 and 10, mixed. After the first blister has healed, repeat it. But when the ringbone will not yield to this treament and goes on increasing in size, hardness and lameness or when it has reached the second stage without treatment, there is nothing so effectual as the actual cautery (firing iron.) It is applied in lines running up and down parallel with each

other, beginning at the corner of the pastern and extending around the front of it to the opposite side; but do not draw lines in the hollow of the pastern, as the flexion of the leg would keep the part eternally sore. Apply the blister, No. 9, immediately after firing. Remove the shoes and give absolute rest (no exercise at all) for four or five weeks; then turn to pasture for a couple of months. If the lameness is not cured, or shows no prospect of curing, in four or five weeks, repeat the operation, drawing the irons in the same lines made by the first applications. The lines may be made from the coronet to the lower edge of the fetlock joint, a distance of from two to four inches, according to the length of pastern.

A short pastern is more liable to ringbone from the greater amount of concussion it sustains through its lack of elasticity, which the long pastern has. The foot will always grow faster after the leg has been fired for ringbone, therefore the shoes will need to be reset oftener than on a healthy foot, and the hoof reduced.

VIII. Splint.

Splint is an enlargement on the cannon bone just below the knee, usually on the inside, but it is sometimes seen on the outside. Splints are quite common on the fore legs; in fact, nearly all horses that have seen

DIAGRAM.

Showing the different locations of splints. 1. High splint near the knee. 2. Low splint far below the knee. 3. Bony tumor, often miscalled a splint.

SPLINTS OF A SERIOUS KIND.

1. Splints involving the knee joint. 2. Splint interfering with the back tendons. 3. Small splint under the tendon of the extensor muscle.

much service have them, but they are occasionally seen on the hind legs. The usual seat of them is between the cannon and inner splint bones. Sometimes they attain to the size of a hen's egg, but usually are quite small. They generally cause some lameness when growing, but rarely do so after they become hard.

Causes.—Slipping, jumping, running, kicks, bruising the bone, etc., anything that may sprain the ligamentous attachment between the cannon and the splint bones. Sometimes the splint comes on the surface,

and then it does not cause much lameness, but when it comes under the periosteum (the covering of the bone) it is very painful. When splints come from bruises they may come on any part of the leg.

How to know it.—In the early stage there will be lameness of a peculiar kind, in that the horse will go sound on the walk and will trot lame. Upon examination a sore spot is found below the knee on the inside of the leg. By feeling of it, with the leg flexed, you can locate it immediately. In the later stages a bony lump will form on the leg, adhering directly to it. When the lump is an inch or more below the knee, it is no permanent detriment, but if it is closer to the knee than one inch, it is objectionable, as it is apt to interfere with the action of the knee. When it does affect the knee it usually causes permanent lameness.

DISHING ON THE TROT.

Thought by some to indicate splints, but it is an erroneous idea; for as many dish the fore feet when trotting that have no splints, as there are that have them.

What to do.—If noticed when the injury first occurs, apply either hot or cold water with the cooling lotion, No. 12, till the soreness is nearly gone and then apply the blister, Nos. 9 and 10 mixed. Give a couple of weeks' rest. Feed on light, soft food while idle. When the lameness and soreness to the touch are excessive, especially if the nodule is small, the trouble lies beneath the periosteum and requires the operation periosteotomy to split the covering of the bone to allow the exudate from the inflammation to escape, which will relieve the tension. It is done by cutting a small hole in the skin and pushing in a thin, long blade and cutting the periosteum over the lump. No change need be made in the shoeing.

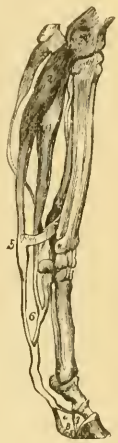
IX. Sprain of Back Tendons of the Fore Legs.

Sprains of the back tendons are very common on account of the severe strain they are put to in all cases of unusual exertion. In such cases, a large amount of the effort is made by the fore legs, especially in racing, where the strain upon the fore legs in grabbing the earth and pulling the body exceeds that of the more powerful hind legs in pushing it, hence the frequency of these sprains. There are four ligaments and tendons in the leg below the knee, and the degree of injury to the horse in case of sprain, depends upon which tendon is most affected. That of the one nearest the bone being the worst, the next one to it being next, and so on to the last on the posterior surface, injury to that one being of least account.

Causes.—Sprains received during severe exertion in running, jumping, trotting fast, slipping on uneven ground, stepping on the edge of a hole

with the toe, letting the heel drop, and sometimes cuts or bruises by a blow across the back of the leg, overreaching, etc.

How to know it.—Severe lameness will be a prominent symptom, the more so the more important the tendon is in the leg. The suspensory ligaments lie next to the bone, and sprain of them can be felt on either side of the leg according to which branch (the inner or outer) is affected, for sometimes only one, especially the inner, is sprained. When it is the suspensory ligaments that are affected, the swelling will be upon each side near the bone, and not far from the fetlock joint. These ligaments are the main support of the leg, and when sprained, the lameness is far more severe than when any of the others are affected.



FLEXOR TENDONS OF FORE LEGS.

1. The perforans. 2. The perforatus. 3, 4. Accessory muscles. 5, 6. Restraining ligaments. 7. The pedal cartilage divided. 8. The navicular bone.

When the one next to the suspensory ligament is sprained, the swelling will be on the sides between the latter and the outside tendon. This tendon, next to the suspensory ligament, is called the perforans. The outside one is the perforatus, swelling of which is seen on the back of the leg, curved backwards like a bow. Sprain of the latter is of the least importance of any of them, as the damage done is slight, being easily cured, and not causing much lameness compared to sprain of the others.

Sprain of the metacarpal ligament is next in importance to that of the suspensory ligaments. They are often affected in common with the perforans. Swelling of it, the metacarpal, is found near the bone just below the knee, but usually extends to all parts immediately surrounding it.

There will be swelling, heat, pain and soreness; when the injured spot is touched the horse will rear sometimes in his effort to draw the leg from your grasp. In resting the leg he will thrust it forward and cock the fetlock, giving it the appearance of being swollen on the front part, and in walking he will not straighten the fetlock back to its natural position but will maintain it in the cocked position. If neglected and allowed to become chronic, the tendons contract and hold the fetlock in that position ever after.

What to do.—Remove the shoe and replace it with heels raised an inch, to take the strain off the back tendons; apply hot fomentations to the part as continuously as possible till nearly all the soreness is gone, wrap the leg in a woolen bandage and keep it wet and hot, applying the water

three or four times a day. Bathe the leg between times with the cooling lotion, No. 12, or make one as follows:

No. 13.
1 Pint strong vinegar,
1 Handful common salt,
1 Pint water,
Mix.

Bandage as tight as the soreness of the leg will allow, with a dry cotton or linen bandage, immediately after applying the liniment. When the soreness is nearly gone apply the following liniment, well rubbed in after bathing with hot water, twice a day, and increase the tightness of the bandage from day to day:

No. 14.
1 Ounce tincture arnica,
1 Ounce tincture opium,
1 Ounce turpentine,
1 Ounce alcohol,
1 Ounce liquor ammonia,
Water, to make one pint.
Mix.

If the liniment irritates the skin much, suspend it for a few days and grease with fresh lard till healed, then repeat it. Give this treatment and rest for three or four weeks, then if there is a probable cure, turn the the horse out for a run at grass; if not, clip off the hair and blister well with No. 9. When the blister has taken, smear over it some fresh lard to keep the air from it and prevent pain. After two days it will need washing, and when dry grease it. Repeat this once a day till healed, and give a long rest. If all these means fail to effect a cure, or if the case is an old, long standing one the firing iron must be resorted to. Clip off the hair and fire in lines feathered as directed for curb. We would recommend in this, as well as in all similar cases, that the operation of firing be done by a qualified veterinary surgeon, for it is very easy to ruin a good horse by firing too deep; it is an operation that requires experience and good judgment.

It will be found in most cases in which the suspensory ligaments are sprained, that the firing iron will have to be used, as they are very obstinate and will not yield to mild treatment. But in most cases in which it is the others that are affected the milder treatment will be effectual. To get the thickening out of the blistered leg, after the treatment is done, shower the leg with cold water two or three times a day, and also give it plenty of hard rubbing and bandage. Omit the high heels as soon as the soreness is gone from the tendons and before giving the treatment requiring the long rest.

X. Broken Down.

Causes.—Broken down is the term applied to rupture of the suspensory ligaments. It is most common among racers, because the strain their fore legs are put to in a race exceeds the strain of all other kinds of work. The force of the stroke comes on the fore legs. They grab the earth, pull the body forward, and when the body is passing the poise, and just before lifting the forward foot off the ground, they give a tremendous push that sends the body forward and at the same time high enough to avoid falling on the nose while gathering their feet for another spring. It is during the spring, just after the body has passed the poise, that breaking down takes place.

How to know it.—The ligaments are ruptured, the toe turns up and the fetlock pad comes down to the ground, completely ruining the animal.

What to do.—In cases of complete break down it is an act of mercy to destroy the animal. But horses are often so nearly broken down that they are ruined for all kinds of active labor, yet might be saved for breeding purposes by giving the leg thorough treatment, and a year's rest. The same treatment prescribed for sprain of the back tendons will apply to this, especially the firing, which is absolutely necessary.

CHAPTER VI.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES---CONTINUED.

I. CAPPED OR CAPPED HOCK AND ELBOW.—II. FRACTURES.—III. OPEN JOINT.—IV. BROKEN KNEES.—V. KNEE SPRUNG.—VI. COCKED ANKLES.—VII. WINDGALLS.—VIII. SHOULDER LAMENESS AND SWENEY.—IX. CRAMP OF THE MUSCLES OF THE THIGHS.

I. Capulet or Capped Hock and Elbow.

The elbows and points of the hocks are liable to injury, giving rise to swellings of the nature of tumors. They are filled with a watery exudate, slightly tinged with blood. If not emptied and properly treated they become caloused and organized into a solid fibrous mass in the course of a month or so. When this takes place, the callosity on the elbow becomes very heavy and hangs from the elbow, a very unsightly mass, sometimes as large as a child's head.

The callosity on the point of the hock never gets so large as on the elbow, but becomes just as hard and unsightly, and is more noticeable being farther from the body.

Causes.—Bruising is the only cause. It is usually long continued, hence the gradual development into a hard fibrous tumor. The one on the elbow is caused by laying the point of the elbow on the shoe or on the hard floor. Some horses have the habit of pawing the bedding all back before lying down, and letting the elbow come directly on the floor, while others always lie with the elbow on the shoe. Either way of lying, if continued for any length of time, will bruise these points and a watery exudation is formed, which fills the sack. If not evacuated it increases, and may suppurate and break, or it may become organized and solidify, the walls thicken and the whole become a solid mass.

CAPPED HOCK.

AN UNUSUALLY LARGE CAPPED HOCK.

The one on the hock is usually caused by kicking either in the stall or harness. It is often seen on nervous, high-spirited horses that do not get

work enough, become restless in the stable and go to kicking to amuse and exercise themselves, and thus bruise the points of the hocks against the sides of the stall; if kept in a box stall, they are just as apt to do it. It is also often seen on draft horses that are worked to the cart; being hooked too near to the box, they strike it with their hocks every time their legs are raised. Sometimes it is caused by runaways or by pieces of timber falling on the hocks.

How to know it.—In case of the elbow a scurfy, wrinkled appearance indicates the danger, and if not attended to and the cause removed, it goes on growing day by day, till a large tumor is developed. Sometimes by a sudden shifting of the position of the feet in lying, a large, hard, hot swelling may spring up in one night; it may be only a couple of inches thick, but may be eight or ten in diameter, very sore to the touch; but when the tumor grows gradually it is not usually very sore.

When on the hocks, the points are found much swollen, hot, tender and sore to the touch. The trouble usually comes on suddenly with one or two nights' kicking.

What to do.—When hot, sore and of short duration, remove the cause; give a laxative of one and a half or two pints of raw linseed oil; foment the parts with hot water, with a handful of common salt in it, for an hour or so, then rub dry and rub gently in, the following liniment:

No. 15.
1½ Ounce tincture arnica,
1½ Ounce liquor ammonia,
1 Ounce tincture opium,
Water to make one pint,
Mix.

Repeat morning and night for two or three weeks, and if the case is a mild one, this treatment will cure it. In case it is the elbow and there is a soft fluctuating feeling, tap it with a knife and let the water out, making the opening large enough to pass your finger in. Syringe out the sack with warm water and follow it with No. 6. Repeat it twice a day, continuing the external treatment the same as before. After the oil has operated, give one of the following powders in the feed morning and night:

No. 16.
2 Ounces rosin,
2 Ounces saltpetre,
Powder and mix,
Divide into twelve powders.

It should be borne in mind that the cause must be removed absolutely, in order to have the treatment of any avail, otherwise it will all be lost, and the tumor will continue to grow in spite of all you can do. When h-

lies on the floor, give more bedding; if on the shoe, apply a roller to the pastern, as large as your arm, so as to let it take the bearing on the arm instead of the elbow on the foot. If it is a very bad case, it will be well to keep the horse standing a few days. If it still remains large and hard, change the injection to the following:

No. 17.

1 Drachm iodine.
1 Drachm iodide of potash.
1 Ounce alcohol.
1 Pint water.
Mix.

Inject a little, twice a day, after using the hot water as before. When dry apply tincture of iodine twice a day, till it gets very sore, then grease it with fresh lard till healed, and repeat it.

If it becomes hard and solid, the only remedy lies in dissecting it out bodily. The operation is quite simple. Cut the opening in the skin in a line running up and down, then cut the cellular tissue around the tumor and dissect the whole lump out, being very careful not to cut into the elbow joint. If an artery or vein is cut so as to bleed a stream, take it up and tie it, sew the skin together, and dress it three times a day with the lotion, No. 6. If the stitches break out, and the wound gapes open, it is no use to resew it, but dress it three times a day with No. 7, and it will draw together as it heals. We would urge in this connection the employment of a qualified veterinary surgeon to perform operations in every case, as the use of the knife requires a thorough knowledge of the anatomy of the parts, as well as experience to avoid giving unnecessary pain to the animal.

Where it is the hock that is affected, the same treatment will suffice in all matters of detail until you come to puncturing the sack, when you must stop. Never cut into a capped hock except in a rare, exaggerated case, and then employ a veterinary surgeon to do it. Hand-rubbing will do a great deal towards making it absorb. As soon as the inflammation is well reduced, and all points working satisfactorily, the horse may as well be at work as idle.

Prevention.—Give the horse plenty of bedding; do not allow a faithful friend to sleep on the bare floor. Give plenty of exercise to avoid mischief in the stable, that may run on to bad habits and vices.

II. Fractures.

Causes.—Fractures of the limbs are very common among horses, not that the bones of horses are more brittle, but they are more exposed to accidents than those of any other animal, man not excepted. They are so active, quick-motioned, fleet and heavy, that when an accident occurs

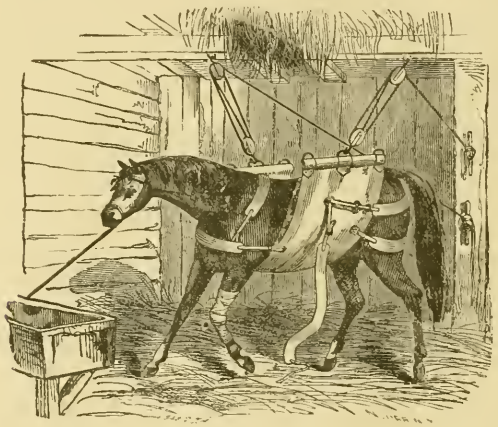
the effects are apt to be disastrous; for, like a railway train, the unlucky animal does not have many chances to come out whole. All bones of the body are liable to fracture, but the bones of the legs are more so from being more exposed. In runaways, the animal often comes to a sudden stop by falling or colliding with some heavy, solid object. Then he is sure to suffer; any one of the limbs may be broken, or it may be the ribs, back, neck, head, jaws, hips, etc. Kicks are very often the causes of fractures, especially of the legs—the cannons, thighs or arms being the bones which most frequently suffer. The bone of the foot is often broken by striking with great force against a stone, post, or any other solid object. The pastern is sometimes split through its entire length by jumping. The writer knew of a case of fracture of the cannon bone of one of the hind legs by catching the toe in the girth of the harness when kicking flies, breaking the bone short off.

Fractures are divided into the following classes: Simple—when nothing else is broken but the bone; compound—when the ends of the bones punch through the flesh and skin; complex—when the bone is shattered into many pieces, and one or more pieces may prick through; transverse—when the bone breaks short off; oblique—when the fracture is in an oblique direction across the bone; green stick—when the bone breaks like a green stick, splitting and bending and twisting without breaking directly off. The bone may be only cracked, or broken without misplacement. The bones of old horses are more liable to fracture than those of young ones, becoming brittle with age.

How to know it.—When the fracture cannot be seen, but is suspected, manipulate it a little, listening attentively at the same time, and you will hear the grating of the ends of the bone together, which is an unmistakable symptom; for grating or rubbing of rough ends together is never heard in health. Great lameness is inseparable from a fracture, be it ever so slight. When the bone is only cracked, there will be great lameness, with few if any conclusive symptoms to indicate fracture, but by careful examination a sore place can be felt; the horse will not bear a pound on the limb, and will keep lifting it as if in great pain. In all cases there will be a rise in frequency of the pulse and respirations from the nervous shock and pain; more or less inflammation follows, and the temperature will be raised a little. As the length of time increases after the fracture, if nothing is done to relieve it, all the symptoms increase, the nostrils dilate, the countenance becomes haggard, and expresses anxiety, the eyes become injected, the injured limb swells, becomes hot, and in all fatal cases, when the inflammation reaches its height, mortification begins and extends towards the body, when death is

only a question of a few hours. The part gets cold and clammy, a peculiar offensive sweat rises on the surface, the skin, if white, becomes purplish, but if black, the discoloration cannot be seen. As soon as mortification sets in the pain ceases.

What to do.—If it is a fracture of the cannon, arm, thigh, femur (the bone between the hip and stifle), shoulder or back, ninety-nine times out of a hundred the case is fatal if displacement takes place, and especially so if it is a compound or complex fracture. If it is a fracture of the back, paralysis of all parts behind the fracture will ensue. In any of



SLINGS FOR A HORSE WITH FRACTURED LIMB.

the above instances, the horse may as well be destroyed, for it is utterly impossible to keep him quiet till the bones knit; they would repair as readily and as substantially as those of man, if we could put him to bed and keep him there six weeks. But take what measures you may, in most cases you will fail from no other reason than that he keeps moving about, swinging the leg, and behaving in a very restless manner generally, which prevents the ends of the bones from remaining in quiet contact long enough to grow together. The bones of dogs, sheep and sometimes cattle, grow together very readily because they are more quiet, and favor an injured leg more than a horse. If it is the shoulder or thigh, it is so deeply imbedded in muscle that it is very difficult to set the bones, especially if the fracture is oblique, for the muscles contract and draw the ends of the bones past their proper positions from two to six inches, and it is an utter impossibility to bring the ends together again even with the aid of pulley and tackle.

But if it is a fracture of the foot, pastern, fetlock, hip or any other part where there is no displacement, a cure can usually be made. After putting the horse in a roomy, comfortable, loose box, put him in slings to take the weight off the injured leg, and relieve the weight from the others. Make the broken limb as straight as possible, then envelop it for a distance of five or six inches in plaster of Paris, or if that is not handy, soak a piece of sole leather in water until quite soft, and mould it to the form of the leg, and bind it on so as to keep it perfectly tight and solid, and in its place. Splints may be put on outside of the leather. A starched bandage is very good in connection with the splints. Have the starch very stiff, fill the hair with it and then begin to wind, not tight but just enough so to keep the parts in their places; put on a considerable quantity of starch with each wind of the bandage; after making about half a dozen turns, put on the splints, one on each side, and one on the back, but none in front; then continue the bandage four or five turns. If the leg swells, so as to make the bandage too tight, slit the bandage up a little way at either end. Leave the whole thing on about five or six weeks, keeping the horse in the sling all the time, just tight enough to give gentle pressure on the belly and he will lie in it at his pleasure. If he acts unruly at first, quiet him by talking to him, and he will very soon get accustomed to the arrangement, and like it.

If any pieces of bone become detached they will act as foreign matter and must be removed. Any such complication in a leg already done up in a starched bandage, or in plaster, will be recognized by increased swelling in the surrounding parts, and also by heat and soreness, uneasiness and increase in temperature, pulse and respiration. The natural condition being: Pulse 36, respiration 10 to the minute, and temperature 98.5° F. The pulse is taken on the angle of the lower jaw, as the artery passes around the under side on its way to the face. Temperature is taken by a clinical thermometer inserted in the rectum, and allowed to remain in two minutes. Respiration is taken by counting the breaths, one in and one out making a respiration.

When the hip is broken down, making what is known as "hipped," there is nothing to do except to give time and what constitutional treatment is indicated. Fracture of the shoulder blade is treated in the same way, except that it might be advisable to put the horse in slings.

In all cases watch the symptoms and treat them as they require, but it would be well always to give the following mixture:—

No. 18.

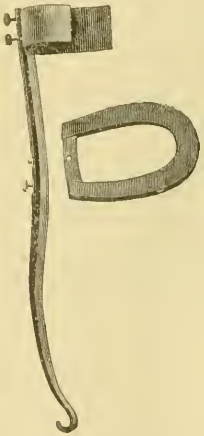
1 Drachm tincture aconite root,
2 Ounces spirits of nitre,
2 Drachms fluid extract belladonna,
1 Ounce nitrate of potash,
1 Ounce carbonate of ammonia,
Water to make one pint,
Mix.

Give one ounce (two tablespoonfuls) every two, four or six hours, according to the requirements of the case. This is the dose for a full sized adult horse, a young or small one in proportion. Continue this as long as there is any fever. Give all the cold water to drink the horse wishes, but give it little at a time and often. If the neck is broken, death ensues immediately, on account of the nervous communication to the heart, lungs and stomach being cut off, and so they stop working.

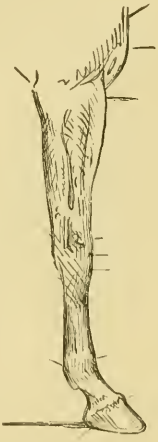
III. Open Joint.

Open joint is one of the most serious accidents that horse flesh is liable to, and unfortunately is quite common.

Causes.—Cuts, bruises, pricks from nails, pricks from the fork in handling the manure and bedding, falling on the road, kicks from other horses, etc., are common causes.



BAKER'S BRACE FOR BROKEN KNEE WHEN THE JOINT IS OPENED.



WHERE JOINT OIL IS.

The lines mark the points where synovia (or joint oil) is interposed between the different structures.

How to know it.—A wound, of course, is present, and a discharge also is seen when it is at all serious. The character of the discharge determines the extent of the injury; if it is an open joint, in addition to pus there will be a discharge of joint oil (synovia). Synovia is inodorous; has no smell; amber colored when fresh; whitish yellow when coagulated; thin and watery, but at the same time is of an oily nature when fresh; coagulates on exposure to the air. When the discharge

partakes of the character given above, especially in the latter particular, and is accompanied by more or less fever, good appetite, gradual wasting of muscular tissues, (though sometimes the wasting of tissue is rapid), tucked up appearance, hard unyielding swelling, with great soreness to the touch, and extreme lameness, there need be no doubt but that there is an open joint.

What to do.—If neglected and allowed to run its own course it will be fatal in almost every case; the horse will die from irritative fever, exhaustion and inanition. Sometimes it is fatal even with the best treatment, therefore it is of the utmost importance that remedies be promptly applied, and vigorously pursued.

When an open joint is recognized, wash the wound with tepid water with a few drops of carbolic acid in it; if the wound is deep, and there is pus mixed with the synovia, syringe it out gently, with the lotion, No. 6; generally, however, it is best not to syringe, probe nor push in the wound any more than is absolutely necessary; but let all the treatment tend towards filling up the wound with healthy granulations. As soon as the wound is nicely washed, make a paste of the following:

No. 19. 2 Drachms glycerine,
1 Drachm carbolic acid,
Flour to make a thick paste.

Make a plug of the paste and insert it into the wound; then smear solid extract of belladonna over all the hard swelling around the wound, and let a cold poultice made of oil-cake meal go on over the whole. Change the poultice and dress it twice a day. When the suppuration ceases, and there is a clear flow of synovia, omit the plug and let the poultice come directly in contact with the wound. Keep the horse as quiet as possible; carry food and water to him, so as to avoid the least motion. If it is practicable apply apparatus to stiffen the joint during the treatment. A convenient appliance will be described in the next article on broken knees.

The most difficult thing in the treatment of open joint is to stop the flow of synovia without checking the flow of pus. For whenever there is pus in a wound it must come out, or damage will be done; at the same time you cannot wash and syringe an open joint to get rid of the pus as you would an ordinary wound, because that would tend to keep the wound open and continue the flow of synovia; consequently there is an opportunity, usually, to display very fine judgment. Give, internally, tonics composed of:

No. 20. 2 Ounces pure sulphate of iron.
2 Ounces chinchona bark,
Powder and mix.
Divide into twelve powders.

Give one night and morning in the feed. Continue this till the wound is nearly well.

IV. Broken Knees.

Broken knee is a term used to designate contusion, abrasion and laceration of the soft parts—skin, ligaments and membranes—over the knee joints, but not the bones. It is quite common, especially where horse-back riding is fashionable, and fox hunting and steeple chasing are practiced. Sometimes the knees are only bruised or the skin broken, and then it is very simple and recovery is quick. But they are often broken right through into the joints, opening them completely and allowing a rapid flow of synovia. Sometimes they are easily cured, and at other times defy all treatment, and the joints become ruined and stiffened; and sometimes large spavins grow upon them. They sometimes prove

BROKEN KNEE.

Manner of probing the dirt sac of a broken knee.

BROKEN KNEE.

Manner of opening the dirt sac of a broken knee when it is found necessary to do so.

fatal by the excessive amount of irritative fever produced; the horse becomes very much emaciated, tucked up in the flanks, runs at the eyes, and weakness is great. Whenever the joints are opened, you have a very serious case at the best, and one that will tax the patience and judgment of the attendant.

Causes.—Knees are always broken by falling on them. The causes of falling may differ. Work horses drop upon their knees sometimes when starting very heavy loads, and if on stony or gravelly roads, are very apt to break their knees. Driving horses stumble and fall on their knees when they are sore in the feet, stiff in the legs or lame in the shoulders, and often open the joints. Saddle horses are the most liable to broken knees; if ridden slowly, on smooth roads, the weight on the back makes them more liable to stumble; if ridden across country they often come upon their knees on the other side of a fence or ditch.

How to know it.—There will be a contused, lascerated, ragged wound; the skin hanging in shreds, hair bruised off, the ends of tendons protruding and curling like bands of white tape. A discharge of synovia (an oily looking, amber colored liquid) takes place, and in bad cases the white glistening bones of the joint can be seen and felt.

What to do.—If the wound is dirty with sand, gravel or other substance, wash gently to remove it. If the ends of tendons or ligaments protrude, clip them off with scissors close down to the edge of the wound; draw the ends of the skin together and bind on a soft piece of old linen to keep the parts in place and the air from it, wetting the wound and linen with lotion No. 6. Then proceed to have the brace made as seen in the illustration on page 288, for it is absolutely necessary to keep the knee stiff and perfectly quiet, so as to get as small a secretion of synovia as possible. Splints are generally used, but they always irritate the leg where they come in contact, and fail in a great measure to prevent motion; but when Baker's brace is used, neither the knee nor any joint below it can be flexed a particle.

To make the brace, take a rod of good iron half an inch square, and of a length sufficient to reach from the ground to at least three inches above the knee; rivet a band two inches wide and six inches long on to the upper end of the bar, and bend it to fit the fleshy part of the arm; then bend the rod in its passage down the back of the leg to fit a healthy limb in its natural position when the weight is on it; make a three-quarter hook at the bottom, bending backward, to hook into the eye in the bar of the shoe, so that it can be inserted and removed at pleasure without removing the shoe. Insert two rivets or a staple at the top, and another set midway between the knee and fetlock, to receive the straps that bind the leg to the brace. Let the straps be an inch wide, and pad between them and the leg, especially over the shin. Pad the band well to prevent abrasion of the skin. The shoe may be an old one that fits the foot, with the heels carried out at least an inch beyond the heels of the foot, and turned upward a little; weld on across the heels of this shoe a bar three quarters of an inch wide, with an eye in the center to receive the hook. The shoe needs to be nailed on very strongly, or the horse will tear it off in his efforts to flex the leg, which he will try to do at first, but he will soon get accustomed to it, and walk around, lie down and get up the same as a man with a stiff leg. The strap at the top wants to be buckled tight enough to keep the brace in place, the one at the center of the cannon tight enough to keep the leg well straightened back in its natural position. The shorter brace is used in the same way in case the fetlock or pastern joint is opened; then it is not necessary to stiffen the knee.

When the brace is adjusted, remove the bandage and linen, and apply directly to the wound a soft, cold, oil-cake meal poultice, wet somewhat with the lotion, No. 6, after it has taken up all the water it will. When ready to be applied, sprinkle the poultice over with finely powdered charcoal. This will encourage and promote healthy, solid granulations and prevent much suppuration and sloughing. Some sloughing and suppuration will have to take place on account of the wound being contused instead of being made by a clean cut, as with a sharp knife. Dress the wound in this manner twice a day; continue it right along till the flow of synovia is stopped, even then it is better to leave the dressing on a few days more to further reduce the inflammation in the part. If the ends of the tendons protrude at any time they must be clipped off. If there is high fever give the following mixture:

No. 21.
1 Drachm tincture aconite root,
1½ Ounce sweet spirits nitre,
1½ Ounce nitrate of potash,
Water to make one pint.
Mix.

Give a tablespoonful every two hours, till the pulse is improved and fever abated. Feed lightly for a good while.

V. Knee Sprung.

Knee sprung is not a disease, but is the effect of disease. When the legs are healthy, the center of gravity passes down through the center of them, and out at the heals; but in case of knee sprung, the center of gravity passes back of the knees, giving them a very bowed appearance. It always comes on gradually, and may stop at any stage, and never get worse; but sometimes it goes on to so great an extent as to render the animal almost useless. Horses often sleep standing, and do it with safety, no danger of falling, as long as the legs are sound, but when the knees are so bowed forwards as to throw the center of gravity on a line forward of the origin of the suspensory ligaments the horse will fall when he goes to sleep standing.

Causes.—The most common cause is sprain or other injury of the back tendons of the leg. The ones most often sprained, and injury to which is most likely to cause knee sprung, are the suspensory ligaments, and the metatarsal ligament. Sprain of these, without proper treatment and rest, is sure to be followed by knee sprung. Sprains of the other ligaments, long continued soreness in the feet, sore shins, soreness in the joint, etc., are also frequent causes. In fact any abnormal condition of the foot or leg below the knee, that gives rise to long continued lameness and resting the heels or leg by knuckling the fetlock, is sure to be followed by a going over on the knees, from contraction of the back tendons

and ligaments, which hold the parts in that position ever after, unless relieved by the operation called tenotomy.

How to know it.—The legs of sound horses are straight from the elbow to the fetlock. Hence, any deviation from that position indicates something wrong. Stand opposite the shoulder of the horse, and notice the leg; any bending forward from the straight line at the knee creates suspicion. Any bad case, and many mild ones, are accompanied with thickening of the back tendons, indicating neglected sprains.

What to do.—There is nothing to be done, except in recent cases, which are rare. A case that has not been longer than two or three months in coming may be benefitted by clipping the hair from the back tendons, wherever there is any thickening or soreness, and showering with cold water several times a day for two or three days, and then applying blister, No. 9, well rubbed in. Remove the shoes, pare down the feet and open the heels. Tie his head up, so he cannot bite the blister, for thirty hours; then grease it once a day till nearly healed, and turn him out for a long run at grass. If he is not improved in a month, repeat the blister.

In old, chronic, incurable cases the operation called tenotomy, can be performed sometimes to very great advantage, but not as often as in case of cocked ankles, which form the subject of our next article. The operation will be therein described.

VI. Cocked Ankles.

The fetlocks are often knuckled forward, but this, like knee sprung, is only a symptom of some other trouble. The fetlocks are, however, often mistaken for the seat of the lameness, and are blistered and mutilated, of course without any benefit.

Causes.—Sprains of the suspensory ligaments, when low down around or below the fetlock joint; lameness in the bursa of the perforans tendon, as it passes over the fetlock; bruises on the heels; corns; quittor; navicular disease, or nail in the foot—anything that makes the horse rest the heels or lower and back part of the leg. Sometimes in bad cases of shoulder lameness, the leg is rested in such a manner as to let the back tendons contract so as to throw the fetlock forward.

How to know it.—It is recognized by the ankle joint being thrown forward like a knuckle; the heels raised slightly; the tendons contracted; and absence of any soreness or thickening in the joint itself.

What to do.—Spare no time nor pains to find the cause and remove it, and the effect will cease. Ninety-nine times in a hundred it is only symptomatic. In a great majority of cases the cause will be found in the feet; treat them, and the ankle will straighten up.

In long-standing cases the tendons become so contracted as to render a return to a natural position an impossibility; in such cases tenotomy is sometimes practiced to advantage. A small opening is made in the skin about midway between the knee and fetlock; a small blade is run in, edgeways, and through to the skin on the opposite side, but not through it; then turn the edge up and cut off the tendons, stopping before the skin is cut above them, being careful not to injure the suspensory ligaments. If they are severed, the animal is useless and might as well be destroyed. To perform the operation, a knowledge of the anatomy of the parts is necessary; hence it is advisable always, when possible, to employ a competent veterinary surgeon.

VII. Windgalls.

The tendons, as they pass down the back of the leg, are covered with a sheath moistened with synovia; and where they pass over the fetlock

WINDGALLS.

Showing situation and forms of Windgalls.

WINDGALLS.

As they appear upon dissection.

joint are synovial bursæ, to prevent friction; there is also synovia between the tendons to prevent them from rubbing against each other. When, from hard work, the membranes secreting the synovia become irritated, they are excited to secrete more than their natural quantity, and the accumulation of it forms the soft, puffy swellings around the fetlocks, either fore or hind. They are always caused by work.

It is an old, popular idea that these swelling are filled with air, hence the name. They seldom cause lameness, except in the early stage, or in the very last stage, when they become ossified; in the first stage the lameness soon passes off; in the last it is permanent.

How to know it.—Soft, puffy swellings appear after considerable work, around the fetlock. They are usually the size of your thumb, but in some cases they grow to the size of a hen's egg.

What to do.—Make frequent applications of cold water, or cooling lotion, No. 12; and after a couple of days apply liniment, No. 11, well rubbed in, twice a day, and bandage tightly over it, till well blistered. Then omit the liniment but continue the bandage, with grease applied to the skin, giving the puffs all the direct pressure possible. Pieces of cork laid over the puffs, and bandaging over them is very effectual.

When the skin is sufficiently healed, repeat the liniment. Continue this treatment for three or four weeks, and then give the horse a run at grass or in a straw yard. This will be effectual if persevered with: but as soon as the horse is put to work again, either road or heavy draft, the windgalls will return.

VIII. Shoulder Lameness and Sweeny.

Shoulder lameness is common. Sweeny is rare, but it is often imagined and severely treated for, when the cause of lameness is very remote. Sweeny is wasting of the muscles of the shoulder blade, leaving the spine on the blade exposed the whole length, with hollows on each side that you could nearly lay your arm in.

Causes.—Shoulder lameness is usually caused by a sprain; it may be of the ligaments of the joint or of the muscles around the joint. Sprain of the latter is most common.

The sprain may be produced by slipping, falling, stepping on the heel of the fore shoe with the toe of the hind shoe, especially in the mud or snow, or catching the heel under a rootor railroad track. Sweeny is usually caused by the shoulder being badly bruised by the collar in hauling heavy loads, or plowing, or by the horse falling and bruising the shoulder.

How to know it.—Lameness is a characteristic symptom; the shoulder and leg are carried forward all of a piece; no knee action; the shoulder carried forward and the leg swung; at the time the leg is being taken forward the head is nodded down at the start and suddenly jerked up toward the finish of the action. There is an inability to raise the leg to step over an obstacle a foot high, but he will drag the leg over. Swelling, heat and soreness are noticed.

In case of sweeny the muscles are wasted as described above, and much the same action of the leg will be noticed. In recent cases of either, the horse will rest the leg by flexing the knee and resting the foot on the toe without extending it. In mild cases, when he is able to travel, rest will seem to cure him and he will go out sound, but will go lame after a little, and get worse the farther he goes.

If allowed to run on without treatment, sprain of the shoulder, especially if it is of the joint, becomes chronic, extends to the bones, affecting the heads of them and causing permanent lameness.

What to do.—In all cases of shoulder lameness where there are heat, swelling, soreness to the touch and lameness, foment with hot water, never with cold, for half an hour at a time, three times a day. It is well to add a handful of common salt to a pail of the hot water. When it has dried after washing, rub well in the liniment, No. 14, morning and night. In most cases, if taken immediately and the above well applied, a cure will be effected, if rest is given, in from one to four weeks. If this fails to cure, a blister well rubbed in over the affected part will do good; use No. 9. In nine cases out of ten, when the lameness is in the shoulder, remedies applied to the joint of the shoulder will be effectual. A common mistake is made in applying blisters over the shoulder blade and withers, which only cause pain and often leave blemishes, without doing one particle of good, except necessitating a long rest; but it is better to have some other excuse for the rest.

When these means fail, the last resort is the seton. When well applied it produces counter irritation, that can hardly fail to cure unless there is porcelaneous deposit on the heads of the bones in the joint. When the exact source of lameness is located, pass the seton down over it just beneath the skin, letting it run always as nearly perpendicular as possible. Let it pass eight to fourteen inches under the skin, and leave the ends projecting three or four inches. The seton is best made of strong, coarse, unbleached muslin, torn into a strip, one inch and a half wide. Fasten leather buttons on each end to prevent it coming out. Smear it once or twice a week with a little fly blister to promote a discharge and increase the irritation. Foment and wash thoroughly clean with hot water morning and night. If the horse is inclined to bite and pull the seton, tie one end of a stick to his halter, and the other end to the surcingle to hold his head and neck straight. A needle made on purpose is needed to insert the seton; it should be fully a foot long.

The seton should be left in three weeks in mild cases, and four to six weeks in bad and chronic cases. Always give from one to three months' rest after removing the seton.

Sweeny is treated by mild blisters of flies in ointment as in No. 9, or in tincture, rubbed in gently, and repeated every fortnight for two or three months. The horse is better at grass while this treatment is being given. It will stimulate the muscles to re-develop. Gentle exercise is better than absolute rest.

IX. Cramp of the Muscles of the Thighs.

The muscles of the thighs are very subject to cramp in hard-worked horses, especially in old ones. These cramps are often diagnosed wrongly, are mistaken for dislocation of the stifle, are in fact rarely recognized except by an expert.

Causes.—Very severe exertion, especially if prolonged to any great extent; the muscles become fatigued, and the nerves in them exhausted; then if the horse is forced to continue working, cramp is very apt to take place. It is sometimes seen in cases where horses are being made to swim; cramps seize these muscles and render them for the time useless, being often the cause of drowning.

How to know it.—The horse is going along apparently all right, except that he is laboring from fatigue, when suddenly one or both thighs cramp and draw all into knots; a constriction will be seen in the hollow of the thigh; the point of the hock is drawn up, and the horse crouches with his hind parts; in fact he is drawn down and is utterly unable to move. On account of the position the hind legs assume, the trouble is often mistaken for dislocation of the stifle. When both legs are affected the horse often falls in the most intense agony, being unable to stand longer. When only one leg is affected it is usually drawn upwards and backwards; he is unable to extend it. If left alone, the cramps may pass off in the course of a few minutes, or they may last several hours.

What to do.—Get hot water as quickly as possible, and apply it, bathing the leg continuously till the muscles relax and the leg is let down, and the horse walks as well as ever. Then rub dry and rub well in liniment No. 15. In the absence of that high wines, tincture of camphor, arnica, hot vinegar, etc., are good. Give the patient a few days' rest.

CHAPTER VII.

LEGS OF THE HORSE, THEIR ACCIDENTS AND DISEASES, CONTINUED.

I. STIFLED.——II. HIP LAMENESS AND HIPPED.——III. STOCKING.——IV. ELEPHANTIASIS OR LYMPHANGITIS.——V. SCRATCHES OR CRACKED HEEL.——VI. GREASE.——VII. MUD FEVER.——VIII. FURUNCULUS OR CARBUNCLE.——IX. DISLOCATIONS.——X. WOUNDS.——XI. SORE SHINS.——XII. OSTEOPHYTES, FOLLOWING SORE SHINS.——XIII. PORCELANEOUS DEPOSIT.——XIV. STRING HALT.——XV. INTERFERING.——XVI. OVERREACHING.——XVII. FORGING.——XVIII. RUPTURE OF MUSCLES.——XIX. ATROPHY OF THE MUSCLES.

I. Stifled.

The term "stifled" is usually applied to a horse suffering from any derangement of the stifle joint, but properly it is only applicable when there is dislocation of the pulley bone, (the patella). The patella is sometimes thrown out, but not as often as is generally supposed, and always on the outside, there being a ridge or flange of bone on the inside which prevents it going that way.

The ligaments of the stifle are often sprained, giving rise to lameness more or less severe.

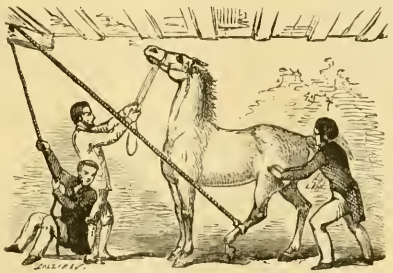
Causes.—Dislocation is produced by a slip and a twist at the same time, the weight probably being upon that leg at the time; the animal recovers from the slip and finds himself with the leg as far back as it can be got, having carried the body forward on it, and when ready to bring the leg forward he is unable to move it. The leg remains protruding backward until help comes to relieve the awkward situation.

Sprains are caused in the same way, but to a less extent.

How to know it.—Dislocation is recognized by the position of the leg as described above, with inability to move it forward. The horse can be made to back, but he will swing himself back over the injured leg without raising it off the ground. The other legs are moved all right, but this one remains with the foot in one position as if riveted to the ground.

Lameness from sprains is recognized by a labored action in carrying the leg forward; the leg is carried farther forward than in health, and is swung outward, flexing the stifle as little as possible. When made to trot, all symptoms are exaggerated. Upon a careful examination with the hand there will be found a thickening around the ligaments and soreness upon pressure. When brought to a standstill he will rest the leg.

What to do.—In case of dislocation tie a rope to the pastern and pull it forward and a little outward at the same time, the man handling the rope standing about a yard from the horse's shoulder; then another man standing at the stifle shoves the bone back into its place, by pushing toward the horse's flank. It will slip in with a snap. Then put on a high-heeled shoe, the heels raised two inches, and bathe the stifle as continuously as possible with the cooling lotion, No. 12. When the inflammation that follows is gone, apply a blister all around the joint, use No. 9. Give a long rest. If this does not cure in four or five weeks, a seton may be put in over the joint, running up and down about four inches; wash it clean once or twice a day with hot water, and leave it in from two to four weeks. When entirely well, replace the shoe with an ordinary one.



DEVICE FOR A STIFLED HORSE.

Showing the manner of replacing the patella, in case the stifle is thrown out.

Treatment for sprains of the stifle is the same as prescribed for dislocation. Do not omit the high-heeled shoe, and give plenty of rest. If it is a mild case a strong liniment may be effectual; apply No. 14. The more heroic treatment may be applied when the mild fails.

II. Hip Lameness and Hipped.

Lameness and accidents are commonly found affecting the hips. The points of the hips often knock against door posts, trees, stakes and posts in the pasture; and also when falling the hip is often the first point to strike. At such times a point is often broken, or the whole hip is knocked down, giving a one-sided appearance to the hips, when they are known as hipped.

Causes.—Ordinary hip lameness is caused by spraining the ligaments or muscles around the joint. It may be done by slipping, falling, being kicked by other horses, etc.

How to know it.—Lameness in the hip is rather hard to diagnose on account of its usually being so deep-seated. A bad case of hip lameness is known by a short step, about half the length of that of the sound leg, while the whole leg is carried together, all of a piece, and swung outward somewhat. When standing he will not always rest the leg, but may stand perfectly sound on it and only show lameness when moving, showing it entirely by labored action, the leg being brought forward slowly and with difficulty.

A HIPPED HORSE.

Showing appearance of the hips when one side is broken down, forming what is known as hipped.

Manipulation will usually find soreness directly over or near the joint, and upon close examination, when standing behind and comparing the two sides, there will be found a slight swelling in the region of the injury. Sometimes the sprain is in the back part of the joint; then the labored action is seen more in backing, the horse going forward with little or no difficulty.

In case of fracture there will be a very perceptible deficiency or falling away in that region, accompanied by great lameness and soreness to the touch.

What to do.—In cases of fracture all that can be done is to make the horse as comfortable as possible and apply anodyne lotions and liniments, accompanied with hot applications, either water or vinegar, and the liniment, No. 15; and also give a long rest, from one to three months. The bones cannot be got at to be set; so all there is to be done is to let nature do the work. The animal will always remain one-sided, and will generally go a little one-sided, partly cornerwise, in the road; but he will be just as useful as ever for ordinary work.

Sprain of the hip is treated the same as any other sprain. Rest, hot water, and liniment, No. 14, well rubbed in, twice a day, will generally cure in from one to three weeks. But in bad cases a blister is often required; rub No. 9 well in over the affected part. If this fails to cure, a seton is the last resort. Let it be a piece of strong unbleached muslin, an inch and a half wide and ten inches long. Run it upwards and downwards, about four inches, under the skin. Leave it in from three to six weeks. Keep the place running by applying a little fly blister to the string from time to time. Give absolute rest during this treatment, and when the seton is removed, turn the horse to pasture or straw yard for two or three months.

III. Stocking.

Stocking is the name given to swelling of the legs, usually confined to the parts below the knees and hocks, although in bad cases it extends above these joints.

Causes.—Weakness of the tissues of the legs, being unable to support the pressure above; weak, watery, impoverished condition of the blood, and the legs being the most dependant part, it settles on them. Standing still is a very common cause, so much so that there is a good deal of it just from standing from night till morning. It is most common in badly drained and illy ventilated stables; and young horses are more subject to it than older ones. It is often a symptom of some disease that requires attention; for stocking in disease is always a symptom of weakness which needs tonics and stimulants.

How to know it.—Swelling of the legs without other symptoms of disease; the swelling entirely disappearing with exercise, but returning when standing any length of time.

What to do.—Give the following tonic, one powder night and morning, in the feed:

No. 22. 1½ Ounce pure sulphate of iron,
2 Ounces nitrate of potash,
Powder and mix.
Divide into twelve powders.

Shower the legs with cold water in hot weather, but omit the water in cold weather, give gentle exercise to reduce the swelling, and when coming in from exercise or work, bandage them tight; if in summer, use cotton bandages; in winter use flannel.

Avoid all strong, irritating or blistering applications. If necessary, repeat the powders. Remove the bandages when going out for exercise, and give the legs hand-rubbing.

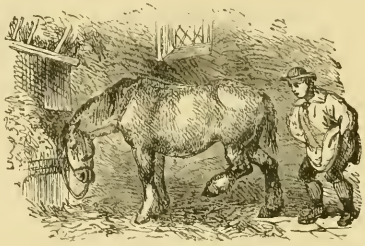
IV. Elephantiasis or Lymphangitis.

This disease, sometimes called weed, is more particularly a blood disease, but being located entirely, by outward appearances, in the legs, we will consider it in this connection. It is usually seen in fat animals, rarely in poor ones. It is a species of surfeit and indicates a fat, plethoric condition of the system, more so than the excretory organs can take care of. It usually attacks one leg, and that a hind leg, though sometimes it is seen in both hind legs, and occasionally in the fore legs. It comes on suddenly after standing still a day or two or more. It often develops between Saturday night and Monday morning. The lymphatic glands of the leg become inflamed and unable to perform their functions, and the superfluous nutritive material is thrown back; the coats of

the lymphatic vessels become weak and the fluid oozes through them, infiltrates the cellular tissue and makes a leg something like that of an elephant.

Causes.—Too high feeding with too little work. When horses are worked every day it will seldom develop, but when a too highly fed horse is left in over Sunday, a rainy day, or from a nail in the foot, etc., the big leg will be found next morning.

How to know it.—An immense leg is seen on entering the stable. It is hot, painful, sore; if touched on the inside of the thigh the horse will raise the leg as high as possible, sometimes so high as to throw himself down. It is with the greatest difficulty that the leg is moved at all. There is a high fever, accelerated pulse, temperature raised, breathing increased in frequency, mouth hot, great thirst, and usually loss of appetite. It is as liable to happen in winter as in summer.



DISCOVERING THE ELEPHANT LEG.

What to do.—The treatment applied is with a view to depletion, to reduce the system to its proper condition in regard to the amount of fat it is capable of taking care of. So the first thing to be done is to give a ball of Barbadoes aloes:

No. 23.

5 Drachms Barbadoes aloes,
1 Drachm gentian,
1 Drachm ginger,
Syrup or soap to mix.

Make it into a ball the shape of your finger, and, grasping the tongue with your left hand, draw it down between the front teeth and pass the ball back onto the root of the tongue with the right hand, keeping the hand up against the roof of the mouth; do it fearlessly, for you cannot get hurt so long as you keep firm hold of the tongue with the left hand. The ball being safely down, put a teaspoonful of saltpetre into a gallon of water and give him to drink. Repeat this every three or four hours till the urine is increased in quantity and clearer in color; then continue it two or three times a day.

Bathe the leg with hot water with a handful of salt in it, for an hour or two, having the water as hot as a man can bear his hand in. Then bind the leg in woolen clothes to keep it thoroughly warm, let them reach clear to the body, and avoid all drafts. Restrict the diet to hay, water and bran mashes till he is able to go to work again. As soon as the soreness will allow of exercise, give him a walk of a couple of hours twice a day, increasing it from day to day. This may be kept up till all soreness and inflammation are gone, when he may go to work again; which will be before all the swelling is gone from the leg, but the exercise will help to reduce it. On coming in from work apply a wet bandage tight; and give plenty of hand-rubbing when going out. Bring the horse back to his feed gradually, and avoid overfeeding.

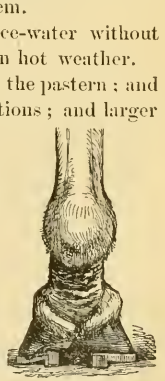
Prevention.—If a horse is working hard every day, and consuming large quantities of very nutritious, heating food, the regular allowance should be cut down one half when he is laid up for a single day or more. He should receive a large, wet bran mash for supper on Saturday night, no oats or corn at all, and only one-half, or two-thirds at most, of the regular allowance on Sunday. If this rule is followed no elephant legs will be found on Monday morning; but if the full allowance of strong grain is fed Saturday night and all day Sunday, the horse is liable to this and many other disorders.

V. Scratches or Cracked Heel.

Scratches or cracked heels are simply chaps and cracks around the heels and in the hollow of the pastern; they correspond to chapped hands in man. They are usually very simple, but sometimes are quite severe and require considerable perseverance to cure them.

Causes.—Exposure to cold mud, snow, slush and ice-water without proper care in fall, winter and spring. It is unknown in hot weather.

How to know it.—The skin is swollen in the hollow of the pastern; and around the heels, cracks and chaps extend in all directions; and larger cracks will run around the leg where it is the most flexed. When dry, they will be hot, sore to the touch, and painful. Sometimes the flexion in moving will cause the animal to raise the feet a couple of feet high at first, but with exercise the soreness partially disappears.



CRACKED HEEL.

What to do.—When the horse comes in, wipe off the parts as nicely as possible, bandage them with flannel to keep them warm, and when dry clean them thoroughly with a brush, not touching them with water at all. Washing with warm water would do no harm if they were well dried afterward, but to be on the safe side it is better

not to wash them at all. When clean, apply easmoline, petrolina, arnica jelly, carbolic salve, or an ointment made of lard and pounded alum in equal parts. Any of these may be applied, both when coming in and when going out. If they get very bad, give him a few days rest. If proud flesh springs up in the cracks, burn it down with burnt alum. If necessary to rest the horse for them, give him a teaspoonful of saltpetre in the feed morning and night for three or four days.

Prevention.—Never wash the feet and legs in cold or wet weather, say after November 1st, till April. It is good for them to be washed in warm weather; it softens the dry, hard hoofs, and cools off the horse when heated; but it is objectionable in cold weather. When coming in from cold slush and mud, dry and clean the feet and legs thoroughly.

VI. Grease.

Grease is the name given to a disease of the lower parts of the legs that seems to be aggravated scratches, but it is entirely distinct from

FIRST SYMPTOM OF GREASE.
Scratching one leg with the other foot.

FIRST STAGE OF CONFIRMED GREASE.
EXUDATION.

scratches. Scratches lies in the upper or cuticular layer of the skin, and grease is inflammation of the deeper layers. It is so called from the nature of the discharge, which is profuse, and greasy in appearance. It has a very offensive odor.

Causes.—Neglected scratches often runs into grease, but there must be other conditions favorable—impure blood, tendency to surfeit, hide-bound and general bad condition. It is just as likely to appear in warm weather, when it is the result of surfeit, as it is to appear in cold weather, when it results from neglected scratches.

How to know it.—The legs are swollen to the knees and hocks, and an offensive, greasy matter is oozing from the pores. When bad they are so sore as to cause considerable lameness. The discharge comes as much, and often more, from above the fetlocks as from below, and

mostly from the long thick hair on the back of the legs. Draft horses are most subject to it. Itching of the part is an early symptom. When grease is neglected, proud flesh sprouts up through the openings made by the pus, and after a while they become caloused and horny, and then they are called grapes. At this stage of the disease the swelling of the leg has become chronic, and can never be reduced.

What to do.—Give the horse a purgative of aloes, No. 23. Feed on bran mashes a few days. When the purging has stopped give a teaspoonful of saltpetre in the feed morning and night for three or four days. Apply hot poultices, with powdered charcoal sprinkled over the top, to the

SECOND STAGE OF CONFIRMED GREASE CRACKS.

GRAPES.
The stage of Grease in which horny lumps are seen, called Grapes.

legs, changing them once a day; continue them till the active inflammation is nearly all gone, then leave them off and apply lotion

No. 24. 1 Ounce sugar of lead,
1 Pint water,
Mix.

Apply three times a day. Wash the parts often enough to keep them clean and poultice them occasionally to keep the inflammation out. While using the lead lotion, give a tablespoonful of epsom salts in the feed once a day. If proud flesh springs up burn it down with burnt alum.

When the disease is cured, if there is any thickening remaining in the legs, work, hand-rubbing and bandaging will remove it.

VII. Mud Fever.

This is fever in the skin of the legs, from the feet to the knees and hocks. The skin is covered with scabs as if it had been blistered, and when they come off the hair usually comes with it, leaving the legs bare.

Causes.—Chilling of the skin by standing or working in cold mud and ice-water. The skin becomes thoroughly chilled, almost like frost-bitten, and when warmed the reaction is so great as to produce much

fever which leads on to the conditions spoken of above, and sometimes to furuncle and carbuncle. It is most common on limestone roads, the soil being irritating.

How to know it.—Swelling of the legs is seen. After being exposed for a day or more to cold, wet mud, or ice-water, they will be found to be very hot and sore next morning. After a few days the hair will be filled with scabs that cling tightly to the skin, but after a few days more they will loosen and come off, bringing the hair with them, leaving the legs entirely bare sometimes. There is usually more or less systemic fever with rheumatic tendencies.

What to do.—If bad, leave the horse in for a few days, wash the legs with warm water and bathe them afterwards with lotion, No. 24. Repeat this two or three times a day. When the swelling begins to go out of them and the skin gets scaly, grease them with fresh lard once a day well rubbed in. Give internally two tablespoonfulls of Glauber's salt three times a day for a few days and follow that with No. 22.

Mud fever often runs into furunculus which will next be described.

VIII. Furunculus or Carbuncle.

Furunculus is the name applied by Prof. McEachran to what is called by many mud fever in an aggravated form, when it takes the form of carbuncle. It attacks the legs, but usually is confined to the coronary region and pastern. It acts a good deal like a bad boil, swells very large, gets very hard and is awfully painful, so much so that when it comes under the coronary band or on the front of the pastern it is often fatal, especially on the hind foot.

Causes.—All the causes that belong to mud fever are applicable to furuncle, and, in addition, an unhealthy condition of the blood which always has a tendency to aggravate any malady.

How to know it.—Extreme lameness is usually the first symptom noticed; a reluctance to put the weight on the foot; a continual raising of the foot, indicating great pain; the horse does not lie down; great fever in the system; mouth hot; eyes red; nostrils dilated and more or less blowing; swelling of the coronet in the region of the carbuncle, unless it is situated an inch or more above the coronet. When this has run on for twenty-four hours the skin breaks in rags and in the course of the next ten hours it sloughs off and a core goes with it varying in size from a cherry to that of a man's thumb. Sometimes the skin sloughs off from a surface as large as the palm of a man's hand. When these cases are fatal the horse dies from irritative fever and exhaustion from pain. The appetite is not always affected, the pain being so great a drain on the system that the horse will often eat more than usual; but in all cases he loses flesh fast and becomes thin and tucked up in a very few days.

What to do.—When first noticed, give a ball of purgative medicine made up as directed in recipe No. 23, regulating the quantity of the aloes by the size of the horse; give from three to five drachms. Then give tincture of aconite root in ten-drop doses every two hours till the purgative begins to work; then stop. Apply a linseed poultice, hot and soft, to the inflamed part. Change it twice a day till the sloughing takes place; then wash it with a weak solution of carbolic acid—one part of carbolic acid to forty parts of water—and renew the poultice; dress it in this way till the sore begins to granulate nicely, then omit the poultice, and dress three times a day with lotion No. 7, washing it often enough to keep it clean.

If the swelling comes directly under the coronet the tension will be immense, on account of the little elasticity in it; the soft parts underneath cannot swell, and therefore the pain will be unbearable unless it be cut. So we would recommend in such cases to sever the coronet by passing a probe-pointed knife in under it and cutting outwards. If it bleeds profusely, which it is likely to do, tie it up loosely for a while with a cotton bandage. Subsequent treatment will be the same as given above. Feed liberally all the time. The healing of the wound will appear to be slow, but patience is required, as the skin will not form over the surface all at once, but must grow over from the edges. If lotion No. 7 is well applied there will be no proud flesh nor other hindrance to the healing process.

IX. Dislocations.

Dislocations are very rare in the horse, except that of the stifle, which is described in the article under that head. The shoulder and hip joints are imbedded so deeply in muscle, and the sockets of the joints are so well guarded by the cartilage that surrounds them that dislocation of those parts is seldom met with. The bones, femur and humerus, fracture through their necks before their heads give way from their sockets. The elbow, knee, hock, fetlock, pastern and coffin joints are all so well guarded by flanges, central ridges, depressions, width of joints, etc., that fractures almost invariably take place before dislocations. In order for a dislocation to occur, many of the strong ligaments that surround and hold their joints togther would have to be ruptured and torn from their attachments, which would be nearly if not quite as serious as a fracture, and in most cases, except that of the stifle, destruction of the horse would be the cheapest treatment; for a great length of time would be required to effect a cure, and the result would be very unsatisfactory.

But in case of a valuable stallion or mare, that might be used for breeding it would be well to give them a chance, by putting them in the

slings and using hot fomentations, and careful bandaging to support the injured joint, at the same time giving internally, mixture No. 21, to keep down any fever that might arise from the injury to the synovial membrane. And after bathing with hot water, which ought to be done three or four times a day, the following liniment may be used, and bandage right over it, applying the bandage middling tight:—

25. 1 Ounce tincture arnica,
1 Ounce laudanum,
Water to make one pint,
Mix.

X. Wounds.

What to do.—Wounds are common, and in most cases have to be treated, at least for the first dressing, at home by those who happen to be upon the premises, owing to the urgency of the situation. Bleeding is often profuse to a dangerous degree, and when stitches are required it is always desirable to insert them while the wound is fresh. For the stitching is not only much more painful and less successful when postponed, but after a few hours, when swelling and suppuration have begun, it is useless, for the edges will not unite and the stitches will certainly tear out, adding to the soreness and blemishing that follows. Hence it is very important for some one about the place to act as surgeon, at least for the time being.

When the skin and flesh are laid open by kicks, calks, cuts, collisions, etc., the first thing to do is to stop the bleeding. Arterial blood is bright scarlet, venous blood is dark blue. When an artery is cut apply the compress above the wound, towards the heart, to intercept the blood as it is coming down. If it is a vein that is cut apply the compress below the wound, for the veins conduct the blood towards the heart. The compress may be a cork bound on the artery or vein, or a wad of cloth, or a piece of dry sponge with a bandage wound over it pretty tight. If the wound is in a position that will not admit of bandaging and there are arteries or veins cut, so as to be dangerous, they must be caught up and tied. In the absence of proper instruments an artery can be taken up with a fine pair of nippers and the end tied with a piece of silk. But in many cases it is unnecessary to tie the artery, since the bleeding may be stopped by filling the cut with scrapings from the flesh side of sole leather, cob-webs, oakum, tow, lint, etc., or a solution of copperas, or the tincture of iron may be thrown into the wound.

If no bleeding is taking place, proceed at once to sew up the wound. Use a needle that is strong and not liable to break while being pushed

through the skin, and silk thread, doubled to prevent its tearing out. Make the stitches about three-fourths of an inch apart and tie each one before taking another. Clip off the hair from the edges of the wound so that none will be doubled under, and bathe it with the carbolic lotion, No. 6.

STITCHING WITH A FIXED SETON NEEDLE.

If the wound is on the leg it is best to draw the skin together with a few stitches, even though they are certain to tear out, and, after dressing with the lotion, apply a bandage smoothly over the wound just tight enough to hold the parts in place. Then let it alone till it begins to suppurate, when it needs washing with warm water and castile soap to clean it, and dress as before with lotion and bandage. When the stitches burst, cut them out.

When the wound is filled up with flesh even with the surface, change the lotion to No. 7, and leave off the bandage. If the wound is on the body and cannot be bandaged use lotion No. 6, till the flesh has made considerable headway towards filling up the hole and then change to No. 7.

If the bone is affected and caries (ulceration) begins, dress it twice a day with lotion:

No. 26. ½ Ounce hydrochloric acid,
1 Pint water,
Mix.

Apply it with a swab directly to the caried spot. The flesh in such a case may be dressed with the other lotions the same as above.

If the joint is affected, treatment for it particularly will be found under the head of Open Joint.

If the tendons are cut off so as to let the fetlock down to the ground and the toe turns up, the horse might as well be destroyed; but if they are only partially cut, or if only one is cut, and the ends protrude through the wound, cut off nice and clean all that sticks out, with a sharp pair of scissors, and draw the skin together and treat as above, bearing in mind that any portion of tendon that may protrude from time to time must be cut off and the end kept inside in order to heal.

XI. Sore Shins.

Young racers are very apt to have sore shins from too much galloping before the bones become thoroughly hardened. The bones all along the leg, from the foot to the knee, become quite sore, somewhat enlarged

and cause lameness. The consequences of sore shins are quite serious as they often render the colt unable to go on with his training. The inflammation is often followed by an ossification of the effusion that is thrown out and gives the leg the appearance of having patches of bone plastered over the shins under the skin.

Causes.—Too much galloping when the bones are soft and young, and the soreness is often aggravated by too much rubbing when coming in from exercise. The bones should never be rubbed hard nor very much, but the tendons on the back of the legs may have all the rubbing they can get. Sore spots on the legs are often produced by bruises, kicks from the toes of stable boys' boots, kicks from other horses, etc. These last named causes are often followed by bony enlargements on any part of the legs, or the enlargements may come directly on a joint, when very serious results may follow.

How to know it.—Soreness forward, shown by a short, stiff, stilted gait; if more in one leg than the other there will be lameness. There is soreness to the touch, more or less swelling all over the surface of the shin bones, or at any point of injury when it is the result of accident. The swelling is soft at first and spungy, but in a few days becomes quite hard and has the feeling of bone. The soreness may extend over the whole surface, or it may be confined to that part near the joints, especially the fetlock and pastern. The animal is inclined to knuckle at the fetlock, and go over on the knees.

What to do. Give absolute rest; remove the shoes; foment the legs with hot water for half an hour at a time three times a day, and follow the hot water each time with the lotion, No. 12, and bandage loosely, wetting the bandages and legs with lotion No. 27, as follows:

No. 27.
1 Ounce tincture arnica,
1 Ounce tincture opium,
Water to make one pint,
Mix.

Continue this treatment till all soreness is gone, then, if necessary, apply a little of the blister, No. 10, rubbed in once a day till pretty well blistered, then grease once a day till healed, and repeat.

In mild cases, where the first symptoms are shown, frequent bathing, say three times a day, with lotion No. 27, and loose bandaging, will prevent its full development, especially if rest is given. In bad cases the rest needs to be prolonged to several months. The same rules and recipes will apply when enlargements come on the bones from kicks and other bruises. The firing iron may be drawn over the spot when near or on a joint, if other and milder measures fail.

XII. Osteophytes, Following Sore Shins.

This is the name given to the bony deposits that follow sore shins. There are several different kinds. The velvety, or villous resembling hoar frost, is usually spread all over the bone in a uniform layer, and is seen on bones of young racers, hack horses and sometimes driving horses. The splintered or laminated kind grows more in excrescences and splintered as in spavin. The warty or stalactite kind grows like a wart with either a pedicle or stem on a narrow base, or may-be a small surface on a large base, or a large excrescence spread on the bone over considerable surface; these are seen on any bone as results of bruises, etc., and sometimes appear around the hock and knee joints. Many other forms may be seen, like tarry matter poured over the bone hot, and hardened while cooling, etc.

Causes.—Hard work of any kind making the bones sore, inflammation sets in and then deposits follow as a natural result. Accidents, bruises, kicks, etc., contribute their share.

How to know it.—The bony enlargement can be seen and felt. In addition to that there will, in all probability, be more or less lameness. In the absence of lameness there will be a stiff, short, stilted gait; more or less knuckling of the fetlocks and going over on the knees—knee-sprung. It is most often seen in hack horses, saddle and buggy horses that get much work.

What to do.—Treatment is unsatisfactory in that it requires a long time, continuous rest and considerable attention, and after all, the horse is not much improved; but it is always best to give it a trial, especially in young and valuable horses. In the early stages the same treatment prescribed for sore shins is applicable, which see; and in the later stages repeated applications of the blister No. 10, and a long rest will help him some, if it is an old, chronic case; and if it is a recent case, it will cure.

XIII. Porcelaneous Deposit.

Causes.—Often in bad cases of spavin and ringbone, and in many other joints of the body, an ulceration of the head of the bone takes place in the joint, the cartilage becomes absorbed and lets the ends of the bones together, and as a result of friction, a bony deposit is made on the ends coming together which gets rubbed and chafed till it is polished as smooth, hard and glossy as porcelain, hence the name.

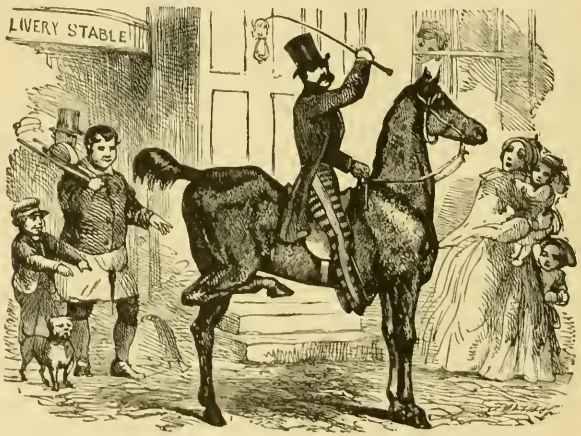
How to know it.—By negative symptoms rather than positive. The horse is always evenly lame; the lameness does not work off with exercise; no treatment does any good, and the true nature of the trouble can only be determined by a post mortem examination.

What to do.—Give the affected joint the treatment prescribed under its proper head, exhaust all known remedies, and when you utterly fail to produce a cure, you may come to the conclusion that there is porcelaneous deposit in the joint which is incurable. No treatment is of any avail.

XIV. String Halt.

Causes.—String halt or spring halt is a purely nervous affection in which the cause cannot be definitely located, but which may be due to any local disorder. It often exists without any visible lesion.

How to know it.—The leg is jerked up towards the body with every step, sometimes so strongly as to strike the belly with the fetlock. Sometimes it is very slight, only showing in moving from side to side in the stall, or only when starting forward or backward. Sometimes both legs



A BAD CASE OF STRING HALT.

are affected. It is usually worse when starting; sometimes it is so bad that the horse has hard work to start at all and will stand and jerk up first one leg, then the other; but once started he goes without hesitation. But it is very fatiguing and wearing; and the horse seldom accummulates any flesh.

What to do.—The treatment is very unsatisfactory, seldom or never resulting in any benefit, but it is best always to treat any local disorder of that region as it requires, with a hope that it will alleviate the nervous jerk.

XV. Interfering.

Interfering is the effect of a variety of causes that make the horse brush the foot that is going forward against the other leg. It may be either fore or hind. He may brush any part of the leg according to the height to which he raises the foot, sometimes the knee or above it, the shin or the coronet, but usually the fetlock.

The fetlock is brushed when the horse is walking or on a dog trot; the coronet, on the walk with very low action; the shin, on the trot when the feet are raised higher than when the fetlock is brushed; the knee, on the trot with very high knee action; above the knee, when there is excessively high action.

The effects of interfering are always bad, but particularly so when it is the knee that is injured. Interfering is usually confined to brushing the foot against the leg, but sometimes the foot is brought against the leg in such a manner as to strike it, causing the horse to go off on three legs for a few steps, and doing great injury by bruising the part. This is sometimes done by horses that do not brush habitually, but from some misstep the foot is brought forward with a swing and strikes the other leg in its passage.

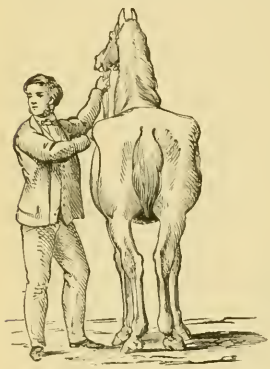
ENLARGED KNEE, FROM SPEEDY CUT.

Causes.—Colts, before being shod, seldom or never interfere, but often do it as soon as shod, while in other cases the fault does not appear until some bungling shoeing is done. The shoeing is a common cause; the foot is often pared down too much on the inner side, tipping the fetlock in so as to bring it in the way of the other foot; the shoe is sometimes left too full on the inner side, projecting out so far as to brush in passing; being shod too heavy or too light often causes it. Colts interfering when shod first, is due to the increased weight of the feet, but when the muscles become accustomed to carrying the shoes it disappears. Malformation is a common cause; the fetlocks are sometimes tipped in; the toes turned in or out giving a swinging motion to the fore feet. Weakness is a common cause, and also thinness in flesh.

How to know it.—There is often lameness from it without any visible marks on either leg or foot; in such a case chalk the foot, or smear lampblack on it and move the horse and it will be demonstrated. But the point struck is usually very plain, also a polished surface on the foot, and sometimes blood on the hoof.

What to do.—The first thing to be done, always, is to apply a boot to the place on the leg that is brushed. Nicely-fitting boots for all parts of the leg are made of both cloth and leather, that protect the part from injury; this done, proceed to remove the cause. If it is in the shoeing

take the horse to a shoer who is an artist in the business, and by close examination ascertain what changes can be made. As a rule no two feet are alike, and it requires an artist and a mechanic to change the position of the feet and legs relatively. A good rule to follow in all ordinary cases is to shoe so as to tip the fetlocks out, giving the feet room to pass by without brushing. This is done by leaving the inner side strong and paring down the outer side, which will throw the centre of gravity in a new line and often prove successful. Instead of leaving the inner side of the shoe full make it rather scant. If the shoes are too heavy, lighten them; if too light, or too large, change them. If the horse is overworked, thin and weak, give him a rest and a little better feeding. There is no plan much more effectual than to spread the legs with good solid flesh, making them travel wider.



A GOOD FORM.

Rear view of a horse showing how full thighs spread the legs and prevent interfering.

If the knee gets larger and the swelling fills with liquid, tap it carefully and let the liquid out. Other points are not likely to be bruised badly enough to cause an effusion. After the cause is removed foment with either hot or cold water and apply lotion, No. 12; repeat it three or four times a day. Gentle exercise may be given if the swelling is not too large and sore. When below the knee bandages may be used to advantage. When the swellings become hard and calloused the liniment, No. 11, may be rubbed in twice a day after a hot bath, rubbing the part dry before applying the liniment.

ANKLE BOOTS IN COMMON USE.

The cuts above illustrate the application of a few of the most common forms of boots, used to prevent injury by interfering.

It should be remembered that there is no chance of reducing the enlargement until the cause is removed. A boot should be worn till the tendency to interfere is obviated.

XVI. Overreaching.

Causes.—Overreaching is catching the toe of the hind foot on the heels, quarters and shoe of the fore foot, often cutting the quarters badly, injuring the hoof and causing it to grow down from the wounded part, giving rise to quarter cracks, weak quarters and rough, horny patches over the heels and pasterns.

What to do.—This is a fault that has to be overcome by proper shoeing. Usually, shoeing quite heavy forward and very light behind will make the horse take up the fore foot quicker, and get it out of the way of the hind foot before the latter strikes it. But in trotting horses, this is insufficient; for, when trotting fast the hind foot passes by the fore foot on the outside to get an extra long reach; but they often fail to do it nicely and cut their quarters badly. This is usually overcome by weighting the hind foot on the outer side of the toe, cornerwise, as it were, to the foot; this will have a tendency to throw the foot outward and forward at the same time.

But in slow-going horses this is impracticable, and dependence must be placed on shoeing. The heels of the fore shoe need to be very short, the toe of the hind shoe set well back under the hoof, and the toe calk, if any, set well back on the web of the shoe; but in such cases, if the work of the horse will allow, it is best not to have any toe calk at all—let the shoe be plain. While trying different plans to overcome the habit, apply quarter and heel boots to the fore feet to avoid ruining them.

XVII. Forging.

Forging is the habit of clacking the hind and fore shoes together when trotting. It is not productive of any harm other than wearing off the toe of the hind foot; but it is very disagreeable and annoying to the driver, and fatiguing to the horse.

Causes.—The position of the feet at the time of the clack is different from what it is popularly supposed to be. The prevailing impression is, that the toe of the hind shoe comes in contact with the heel of the fore shoe, but that is a mistake. As the fore foot is being raised off the ground, with the heel already raised and the foot in the act of rolling on the toe, the toe of the hind foot comes flying in under the heel of the fore, and the two shoes come together, the toe of the hind against the web of the fore, making the clacking noise. It often wears off the toe of the hind foot badly.

What to do.—The object to be gained is to increase the action and activity of the fore leg, to get the foot out of the way of the hind foot. Shoe light behind and heavy forward. Let the weight of the fore shoe be mostly on each side, and the web at the toe as narrow as possible, setting the toe calk, if any, as far forward as you can. Set the hind shoe back from the toe a quarter to half an inch, and the toe calk as far back on the web as possible, and very small. Leave the toe of the hoof projecting over the shoe.

XVIII. Rupture of Muscles.

Causes.—The muscles are sometimes ruptured across the fibres by over exertion, severe sprains, etc.

How to know it.—Great lameness is apparent as an early symptom. Swelling, heat, soreness and pain are noticed in the course of from two to six hours after the accident. There will be unwillingness, amounting almost to inability, to move. When the inflammation has entirely subsided and the swelling is all gone, there will be a depression in the muscle at the seat of the injury from absorption of the injured portion.

What to do.—During the active inflammation, foment with hot water as continuously as possible, and apply in between bathings, the anodyne liniment, No. 27. When the inflammation has all subsided and the hollow in the muscle has formed, apply the tincture of cantharides, lightly rubbed in once a day, till it is pretty well blistered, then suspend it and grease the part once a day till it is healed, and then repeat the blister. Continue this treatment for several weeks and the muscle will generally re-develop. Give gentle exercise during the treatment.

XIX. Atrophy of the Muscles.

This is a wasting away and shrinking of the muscular tissue, leaving a flattened or hollow surface in the place of a full, round muscle. It is similar in effect to rupture of the muscles, but is more extended.

Causes.—Sprains, strains, bruises, severe pressure, etc.

How to know it.—A flattened or hollow surface will be found in the place of the muscle. Compare the part with the corresponding muscle on the other side, and you will notice the affected muscle has wasted away.

What to do.—Repeated applications of the tincture of cantharides will usually make the muscle re-develop, but if it does not succeed after trying for three or four weeks, insert setons over the wasted portion about two or three inches apart, the length of the atrophy; apply a little fly blister to the setons about twice a week. Foment them with hot water twice a day. Leave them in three or four weeks. Give gentle exercise. All means frequently fail to make the muscle re-develop. The animal is often just as useful, but the wasted muscle is a constant eye-sore.

CHAPTER VIII.

BODY OF THE HORSE, ITS EXTERNAL ACCIDENTS AND DISEASES.

I. CARIES.——II. NECROSIS.——III. OSTEO SARCOMA.——IV. OSTEO POROSIS.——V. EXOSTOSIS OF THE JAW.——VI. BROKEN BACK.——VII. SPRAIN OF THE BACK.——VIII. BROKEN RIBS.——IX. BROKEN TAIL.——X. FRACTURE OF THE SKULL.——XI. TUMORS.— XII. GOITRE.——XIII. INFLAMED PAROTID GLAND.——XIV. FISTULA OF THE PAROTID DUCT.——XV. FISTULOUS WITHERS.——XVI. POLL EVIL.——XVII. INFLAMED JUGULAR VEIN.——XVIII. SADDLE GALLS.——XIX. SITFASTS.——XX. SURFEIT.——XXI. DROPSY.——XXII. CHORDES.——XXIII. HERNIA.——XXIV. WARTS.——XXV. RAT-TAIL.——XXVI. ITCHY TAIL.——XXVII. ITCHY SKIN.——XXVIII. MELANOSIS.——XXIX. HIDE BOUND.——XXX. ECZEMA.

I. Caries.

This is molecular death or ulceration of a bone. It may affect any bone in the body. The bones most frequently affected by caries are the teeth; the lower jaw, from injury from the bit; the jaw bones, from diseased teeth; bones of the neck, from poll evil; spines of the back, from fistulous withers; bones of the tail, from docking—in fact, any bone sustaining an injury of sufficient severity to cause a sloughing of the bone substance.

CARIES.

Of the lower jaw—The effect of being a puller.

Causes.—Wounds, either contused, lacerated, or clean cut, affecting the bone, are liable to be followed by inflammation, ulceration, and sloughing of the bone substance.

How to Know it.—A peculiar, offensive odor is the first indication that the bone is affected—an odor of decayed teeth; the discharge that comes directly from the bone is small, but there is sufficient mixed with the pus from the fleshy surface to give the whole the characteristic odor. The surface of the bone is usually rough when felt with the finger, and has a tendency to spread if neglected. The surrounding parts always swell considerably, and become, in long-standing cases, quite hard and callousedd.

What to do.—Wash the part, and make an opening on the under side, if possible, to allow a free escape of the pus; scrape the diseased surface of the bone with a dull edge, and dress twice a day, with the following lotion:

No. 28. 2 Drachms hydrochloric acid,
½ Pint water,
Mix.

Apply with a swab directly to the diseased spot on the bone. This will have the effect of arresting the caries, and promoting a healthy granulation on the surface of the bone, which will fill up the hole. Continue this lotion till all disease of the bone is certainly gone; then change to No. 7, which will heal the flesh wound, or use a little tincture of myrrh, or gum balsam. If it is cold weather, compound tincture of benzoine (Friar's balsam) is probably the best for flesh wounds. These latter may be applied two or three times a day. Treatment of parts requiring particular appliances will be found under their proper heads.

II. Necrosis.

This is death of a part or the whole of a bone; usually seen in the long, harder bones of the body, and quite often in the lower jaw-bones of horses that pull very hard on the bit. Necrosis is sometimes seen affecting the cannon bones of young racers, causing the whole bone to run out, and a new one to form, but it is very rare.

Causes.—External violence is the usual cause, setting up inflammation of the periosteum (the covering of the bone), and cutting off the nutriment of the bone, so that it perishes.

How to know it.—There will be one or more openings in the skin and flesh, through which the pus will find its way; the odor of decayed teeth will be present, and occasionally a small piece of dead bone will pass out with the pus; this dead bone is called *sequestrum*. The discharge is irritating and excoriates the surface it runs over.

What to do.—Make the openings large and dependent to allow a free escape for the pus, and remove the *sequestrum* as fast as possible, for the sooner it is removed, the sooner the sore will get well. Keep the parts clean, and dress three times a day with the following lotion, if the disease is on the surface, so that it can be got at easily:

No. 29.
½ Ounce carbolic acid,
½ Pint raw linseed oil,
Mix.

But if the pus cavities run deep, inject lotion No. 5. If the legs are affected, put the horse in slings.

III. Osteo Sarcoma.

This is cancer of the bone, and forms what is known as *big head*. It is very rare; it affects the upper jaw bone, side of the face and teeth. The bone softens and degenerates into a cheesy substance, and is only held together by the skin; the teeth loosen and are easily removed; the horse is obliged to chew on the other side; sometimes hay and other food collects between the teeth and cheek.

The enlargement increases very fast, and the disease spreads till the whole side of the head is involved; the nose twisted around towards the

sound side; eating becomes painful; sympathetic fever sets in; emaciation becomes great and death ensues in from five or six weeks to as many months.

Causes.—A predisposition in the form of a cancerous diathesis. An exciting cause may exist in the form of a blow or severe bruise on the side of the face, but that alone would not cause the cancer.

How to know it.—Slow, painful mastication with an inclination to chew on one side of the mouth by turning the sore side up, and twisting the head will be the first symptoms noticed. After a few days the side of the face will begin to swell in the region of the fangs of the molar teeth; great tenderness will be evinced upon pressure; the gums will swell and extend down between the teeth; speculæ of bone pierce through and make the surface rough and cause bloody saliva to flow profusely from the mouth. After the disease attains to considerable size the nose will turn over toward the sound side; the lining of the nose swells so as to almost obstruct the breathing, giving rise to considerable roaring. If the skin is pierced the bone will be found to be easily punctured.

What to do.—It is utterly incurable, and calls for humane destruction of the animal as soon as the disease is satisfactorily known to exist.

IV. Osteo Porosis.

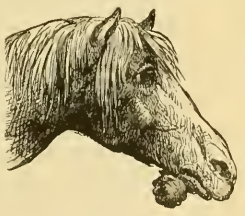
Osteo porosis is the opposite of osteo sarcoma. The bone becomes hard, porous and brittle from too abundant deposition of the salty, harder portion of the bone. It is very rare in the lower animals, and is incurable.

V. Exostosis of the Jaw.

This consists in the growth of bony tumors on the lower jaw, where they are quite often seen.

Causes.—It is usually caused by some external injury, often by the curb chain.

How to know it.—They are sometimes spread over a large portion of the jaw-bone with a very broad base; sometimes they are in the form of little nodules the size of the end of a man's thumb, with a very small base. They become perfectly hard and do no harm, usually, farther than to be an eyesore.



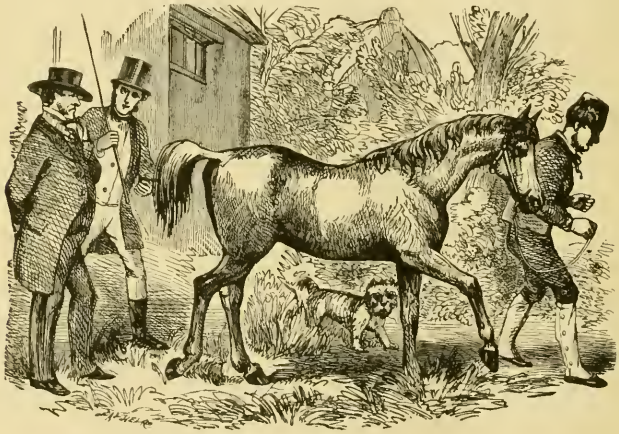
BONY TUMOR.
Caused by curb-chain.

What to do.—Treatment is useless, owing to the late stage of the inflammation. If the true nature of the disease is known while the tumor is forming, repeated blistering with No. 10 will do much good.

VI. Broken Back.

Causes.—The back is sometimes broken by heavy objects falling on it; this quite frequently happens in Northern cities by snow and ice sliding off the roofs of houses. Sometimes the horse falls through traps and holes, and the back is sometimes broken when being cast for operations.

How to know it.—If the spinous processes only are broken, there will not be much change in outward appearance; but the crepitation characteristic of all fractures will be noticed and probably some alteration in the straight outline of the back will follow—it will become depressed in the region of the fracture. But, if the back is broken so as to press



HORSE SUFFERING FROM PARTIAL PARALYSIS OF HIND LEGS.

upon the spinal cord, it will cut off all sensation and power of motion from all parts back of the fracture. This inability to move and feel is paralysis and is due to the pressure of the broken bones upon the spinal cord.

Sprain of the *psoæ* muscles is sometimes mistaken for broken back, but the distinguishing difference is very plain, and the test easily applied. Prick the tail or any part back of the fracture with a pin: if there is no sensation the back is injured, and the spinal cord is enduring pressure; but if the *psoæ* muscles are only sprained, while there will be inability to move the hind legs, there will be sensation and ability to move the tail when pricked with a pin.

What to do.—If the spinous processes only are fractured, the animal will recover. Put him into slings if he can stand when raised; if not, leave him on the floor, as he is safer and more comfortable there than in the slings, unless he can bear the most of his weight comfortably on his feet. Apply cold water rugs to the fracture, and bathe the part occasionally with tincture of arnica or camphor. After the active inflammation has subsided, stop the cold water and just give the horse time, and nature will mend the fracture. But if any of the broken pieces of bone do not reunite, and continue to act as irritants, cut down upon them and remove them.

If the back is absolutely broken, so that there is inability to move, and no sensation in the hind parts, particularly if there is displacement, treatment is useless, and the animal ought to be destroyed, for it is only a question of a few days for him to die, and he might be saved all the suffering accompanying a natural death.

In case there are broken bones to remove, it is best to wait till the irritant is located by the abscess that is sure to follow; then, when the abscess is soft, tender, and nearly ready to break, open it sufficiently to allow the finger to enter, and remove the pieces that are acting as thorns.

VII. Sprain of the Back.

Causes.—Sometimes the back is only sprained by slips or falls, but if the sprain is severe, many of the same symptoms will be noticed, and the

TEST FOR SPRAIN OF THE BACK.

ligaments, and sometimes the coverings of the spinal cord, are involved; these are amenable to treatment but recovery is often slow.

How to know it.—Sprain of the back is diagnosed by pressing the thumb and finger along the spines, and by throwing the weight suddenly on the tender spot, when pain will be evinced.

What to do.—The treatment consists in clipping off the hair along the back, and rubbing in well the blister, No. 9. Oil the blister once a day afterwards. Repeat it if necessary after a couple of weeks. Give a long rest and a run at pasture.

VIII. Broken Ribs.

Causes.—The ribs are often broken by falling, colliding with trees, walls, etc., while running away, kicks from other horses, etc. If displacement occurs, the ends are apt to puncture the *pleura* (the membrane that lines the chest and covers the lungs), and the lungs; in either case the effects may be very serious, from hemorrhage and inflammation in the parts wounded.

How to know it.—If there is no displacement there will be no external alteration in the body, and the diagnosis must be based upon rapid breathing, the breath being cool, and effort to raise the flanks forming a crease along the sides of the belly to avoid working the ribs in breathing, unwillingness to move, and upon the horse persistently remaining standing.

If displacement takes place there will be either a bulging in or out, according to whether the ends are tipped in or out, but they are usually tipped in, leaving a hollow over the fracture, and puncturing the *pleura*, in which case there will be, in addition to the symptoms above mentioned, more evidences of pain and some bleeding from the nose, loss of appetite for a day or two, and more or less fever, according to the amount of injury done to the chest and its contents.

What to do.—After moving the horse as carefully as possible to his loose box, apply a bandage with surcingles directly over the fracture, and draw them middling tight, to prevent working of the ribs. Then watch the symptoms, and treat them as they arise, to subdue fever, stop hemorrhage, etc. The fever is best kept under control with the following mixture:

No. 30.
1 Drachm tincture aconite root.
2 Drachms fluid extract belladonna.
Water to make four ounces.
Mix.

Give a teaspoonfull every two hours, if there is much fever, till it is reduced. Feed on soft feed. Give perfect quiet till the horse is willing and able to take gentle exercise, which will be in four or five weeks. Two months should elapse before the horse is put to work.

IX. Broken Tail.

Causes.—The tail is sometimes broken at the dock, or where it joins the body, by the horse falling through floors to a floor below, or by some heavy weight falling from above, or by rearing up and falling back; in fact, any accident that may break the back will break the tail if the blow strikes in the right place. The place where the fracture is most likely to occur is about three or four inches above where the tail leaves the body,—at the point where the tail begins from the upper part of the pelvis, called the sacrum.

The sacrum being without joints and inelastic, is protected by the flat bones of the pelvis, but just where the protection ceases the tail begins, so that in case of a fall on the rump, the tail is most likely to break at its origin.

How to know it.—There will be a sudden dropping of the outline of the upper and back part of the rump; the dock will be dropped down into the space between the posterior joints of the hips, pressing down the anus, and making it very difficult, if not impossible, for a mare to be delivered of a foal. A mare with the dock broken down never should be bred.

What to do.—Nothing can be done for it except to try and raise the part by introducing the hand into the anus, but as nothing can be fixed to retain the parts in position, the attempt will not be attended with success. It is no permanent injury for work, but is a great eyesore.

X. Fracture of the Skull.

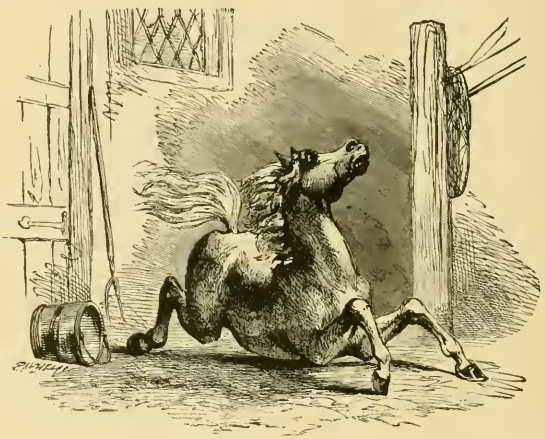
Causes.—The skull is often fractured by kicks, blows, bruises, collisions in runaways, etc.

A HORSE DYING FROM ABSCESS WITHIN THE BRAIN.

How to know it.—Besides the external marks of violence, there will be either stupor or delirium from pressure on the brain, and more or less

fever may follow; also accumulations of serum in the ventricles of the brain, delirium, convulsions and death.

What to do.—Trephine the bone and remove the portion that is pressed down into the skull and is liable to cause pressure on the brain. Keep the wound clean and treat it as a simple wound. If the pulse rises and fever sets in, give the fever mixture, No. 30, and apply ice poultices (chopped ice and bran) to the head continuously for several days and nights. If he gets better it will be in the course of three or four days, but if the fever rises and delirium increases it will terminate fatally in



A HORSE MAD FROM INFLAMMATION OF THE BRAIN.

from three to six days. If he gets down and raves and fights furiously, he had better be hobbled to prevent him from injuring himself and his attendants. If necessary he may be thrown down on a soft bed and confined, when it will be easier to apply the ice and give the medicine, and increase the chance of recovery. In this, as in all fevers, give the patient all the water he will take—in small quantities and often. If it is in cold weather keep him warm and dry.

XI. Tumors.

Causes.—Tumors are preternatural growths, that develop on any part of the body. They may be fatty, fibrous, bony, cartilaginous, glandular, and fungoid. They develop without any apparent cause. Sometimes they do little or no harm except to blemish the appearance; at

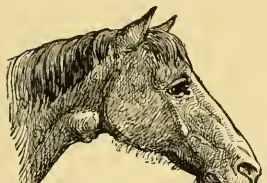
other times they do a great amount of harm: interrupt the circulation, breathing, mastication, cause paralysis when on the brain, and injure the eye when near it.

How to know it.—Fatty tumors, as the name indicates, are fatty in composition, and grow oftener on the internal organs, sometimes around joints. Fibrous are hard, caloused, fleshy lumps like shoe boils, lumps on the ribs, etc. Bony tumors are similar in structure to bone, though not so dense; they grow on bones, and are often the results of bruises. Cartilaginous tumors are those that grow on cartilages, and are a part of them; are seen on the brisket, shoulder blades, etc. Glandular tumors are hypertrophied glands, abnormal growth of the glands, and they become indurated and remain so—see goitre and inflamed parotid gland. Fungoid tumors, are those that sprout up like fungus; they are exuberant granulations, and bleed easily when touched; they are seen quite often around the eyes, and may grow from the surface of any wound.

What to do.—Treatment of tumors, almost always involves surgery that requires a qualified veterinary surgeon to perform. The knife should never be used to any extent, except by an expert.

XII. Goitre.

This is hypertrophy of the thyroid gland, that is situated on the under side of the neck, about five to eight inches below the angle of the lower jaw, on each side of the windpipe. It sometimes attains the size of a child's head, and presses against the trachea, so as to interfere with the breathing.



GOITRE OR BRONCHOCELE.

Causes.—The cause is unknown.

How to know it.—By the large, hard lump on the side of the neck. It is movable, insensitive, and grows slowly.

What to do.—Wash it thoroughly once a day with hot water and soap, to remove all dirt, scurf, etc., then, when dry, rub well in a piece as large as a chestnut of the following ointment:

No. 31. 2 Drachms iodide of potash,
2 Ounces lard,
Powder and mix.

Continue this for three or four weeks Treatment may be carried on while working.

XIII. Inflamed Parotid Gland.

These glands are situated on each side of the throat, running from very near the ear to the angle of the lower jaw, and are about the size of a medium sized hand.

Causes.—They become inflamed occasionally from cold settling in them, or from injury.

How to know it.—There will be considerable enlargement, and soreness upon pressure in that region; hot, dry mouth; painful mastication, and more or less general fever.

What to do.—Bathe them with hot water and apply linseed poultices. Give internally fever mixture, No. 18, till the fever is subdued. If the gland suppurates and comes to a point in any spot, open it, and continue the poultices as before.

XIV. Fistula of the Parotid Duct.

Causes.—Sometimes from a tumor or lump of hardened food in the region of the parotid duct (in the cheek opposite the third molar of the upper row of teeth), the opening of the duct becomes obstructed, inflammation sets in, and the duct often breaks out in a fresh spot. And on account of there being a constant flow of saliva, the opening soon becomes fistulous.

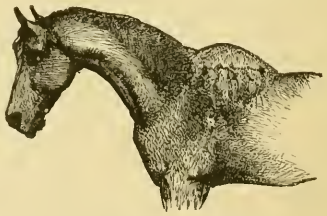
How to know it.—A sore is found on the cheek, usually on the outside, but sometimes on the inside; but the inner one does little harm as the saliva is not wasted. The saliva flows continuously, but more freely during mastication.

What to do.—Clip off the hair around the opening, and remove any irritant or obstruction on the inside; see that the natural opening is clear. Scarify the edges of the external opening to make a fresh wound of it; then apply the paste, No. 19, to the opening, and let a cold linseed poultice go on directly over it. Dress it in this manner twice a day, and the fistulous opening will soon close if the natural passage is kept open.

XV. Fistulous Withers.

Causes.—When the withers become bruised, swollen and festered, and

SLIGHT ENLARGEMENT WHICH MAY END IN FISTULOUS WITHERS.



FISTULOUS WITHERS—WORST STAGE.

running sores follow, pipes are formed and constitute fistulous withers, (*thistelo* of the horse doctor and cow leech).

How to know it.—A constant discharge is seen to come from the swelling around the withers and run down over the shoulder. The pipes conveying the pus are white, with thick walls, and very tough. The pus is ordinary healthy pus, unless the bones of the spine are affected, which is often the case, and then the pus will have the strong offensive odor characteristic of caried bone.

What to do.—The knife must be used freely, but cautiously, and it is urged, as in all similar cases, to employ a qualified veterinary surgeon if possible. But if it is impossible to procure one, make the best of a bad case and open the sinuses right up from top to bottom. If there is a large hollow space on the tops of the bones under the skin, open the skin right up from end to end, letting the cut run lengthwise the horse. If the ends of the bones are exposed and caried, rough, diseased, and smelling badly, the diseased portions must be removed either with bone forceps or a fine saw, and dressed twice a day with lotion No. 28. Dress the pipes with lotion No. 1, twice a day for a week, then change to No. 5, alternating them. If the bones of the withers are exposed, but not caried, use lotion No. 5 on them and alternate it with No. 7; use one a week, then the other.

XVI. Poll-evil.

This is a fistulous sore affecting the bones of the neck near the top of the head or poll.

Causes.—It starts with a bruise from striking the top of the head against a low ceiling, doorway or roof of a car when being shipped, rearing and falling backwards, etc. Suppuration sets in; the pus breaks out on the top, like any other abscess, but burrows down into the bones at the same time, differing in this respect from ordinary abscesses, so that, within a few days after bursting on top, it has burrowed down so as to reach the bones or the joint between them. In old, long-standing cases the disease sometimes causes the *ligamentum nuchæ* to become so rotted and eaten away by the suppurating process as to break, letting the head drop. The animal in this case is rendered useless.

POLL-EVIL DURING THE FIRST STAGE.

How to Know it.—There is always more or less tumefaction and flow of pus, which runs down the sides of the neck. The pus has a strong, disagreeable odor coming from the tendinous muscle, and, when coming from the bone, it will have the characteristic odor of caries.

In the course of a week or so, pipes form, and their walls get thicker and thicker as they are allowed to run.

What to do.—As in the treatment of all fistulous sores, the sinuses must be opened up and a free dependent opening made for the pus. It is more difficult to do this in poll-evil than in almost any other case; but the sinuses usually run down into the muscle of the neck more or less. Follow them and open them up freely; then, there being a free connection between the top of the sore and the bottom of the sinuses, wash it out thoroughly and inject lotion No. 5, twice a day. If it is noticed in its incipient stage, apply a linseed poultice, hot and soft, till it is ready to open; then open it and inject lotion No. 5, twice a day; continue the poultice till the holes all fill up with fine, solid, healthy, granulations; then apply lotion No. 7, three times a day. If the bones are affected so as to expose a caried surface, wash them off with warm water and scrape the rough surface to expose the healthy bone; then dress it by applying lotion No. 28, twice a day with a swab till the exposed surface of the bone granulates so as to feel like velvet when touched with the finger; then change to lotion No. 29. Alternate lotions No. 29 and No. 5, one week on and one week off. If proud flesh springs up, keep it down with powdered bluestone.

POLL-EVIL IN ITS SECOND STAGE.

XVII. Inflamed Jugular Vein.

Causes.—This disease is not so common as it used to be in the days of bleeding. Bleeding is rarely resorted to now-a-days: hence the infrequency of this trouble, for it is always the possible sequence of bleeding. As the effect of this inflammation, the vein is liable to become obliterated, filled up and caloused so as to remain so, the work of returning the blood to the heart being done by the vein on the other side of the neck.

A horse with a jugular vein obliterated, cannot graze on account of the rush of blood to the head, owing to the lessened capacity to return the blood from the head freely.

INFLAMED JUGULAR VEIN.

Position of a horse with inflammation of the jugular vein.

How to know it.—In the active stage of inflammation the vein and contiguous parts will be swollen, sore and hot. In the later, chronic stage, the vein will be a hard, inelastic ridge running down from the head to the body, above the windpipe.

What to do —After bleeding, watch the vein for several hours. If it bleeds, and the blood coagulates, and the vein begins to swell, bathe it with warm water, and manipulate the clot to try and break it down, and make it pass on. Continue this till all danger of obliteration is past. Once the vein has become obliterated, nothing can be done.

If the inflammation continues and abscesses are likely to form, apply a blister of tincture of cantharides, after having removed the pin. If sinuses form and sacks of matter are found, open them freely, and continue the hot fomentations and poultices; syringe the sinuses and abscesses with lotion No. 5. When the sinuses and wounds fill up, if any flesh presents itself too prominently, dress it once a day with burnt alum.

INFLAMED JUGULAR VEIN.

Appearance of the jugular vein when abscesses have formed.

XVIII. Saddle Galls.

Causes.—When a badly-fitting saddle is ridden any length of time, or a saddle is kept on a back unaccustomed to carrying one, the back gets bruised, scalded with the sweat, chafed with the saddle, and the skin rubs off in spots, leaving raw sores exposed. The same applies to the collar, breast plate or harness saddle.

What to do.—Foment them with hot water with a little salt in it, three or four times a day, wipe dry and apply lotion No. 24, or the following:

No. 32.
1 Ounce vinegar.
½ Ounce tannin.
1 Quart water.
Mix.

Sometimes the skin will become dead, and continue to hold on fast to the flesh like a scab; this must be removed with the knife before it can begin to heal. Make it a clean, fresh, active wound, and it will heal readily with the above treatment. It is absolutely necessary to remove the cause by either leaving off the saddle, collar, etc., till it heals, or by remodeling the same so as to give an even bearing on the back or shoulder.

XIX. Sit Fasts.

Causes.—These are large, calloused, tumor-like lumps on the back, as a result of saddle galls, or on the points of the shoulders, from collar galls. When the animal is continued at the work that causes the galls, these calloused swellings make their appearance.

What to do.—Any treatment other than the knife is of little use. They can be easily dissected out by cutting around them carefully and taking them out bodily; then treat the wound as a simple wound. Keep all

pressure off till it is thoroughly healed. A breast collar can often be used in the place of the ordinary collar, while waiting for the wound to heal.

XX. Surfeit.

Surfeit is the term applied to the breaking out of pimples on the skin. It is an effort of nature to throw off some of the impurities of the blood, due to plethora. When the body gets fat and the blood rich, the liver and kidneys often become inactive, and that throws an extra amount of work upon the skin; and surfeit is the effort of nature to get rid of superfluous heat and effete matter.

A HORSE AFFLICTED WITH SURFEIT.

Causes.—Too high living, with too little exercise.

How to know it.—A rough, scabby surface will be found on the skin. Sometimes it comes out, suddenly, all over in little blotches, that may disappear in the course of a few days, or may scab over, owing to the surface fever that usually accompanies it. Little or no difference, otherwise, is noticed in the health, of the horse. There is sometimes a great amount of itching, and sometimes none.

What to do.—From the nature of the affection, the treatment indicated is to deplete the system. The best way to do is to give a full dose of purgative medicine, restrict the food, and give more exercise. The best purgative for the horse is from four to seven drachms of Barbadoes aloes, according to the size and age of the patient, and the time of year. Six drachms is the dose for an ordinary-sized horse. Larger doses may be given in the spring than in the fall. The dose must be diminished in

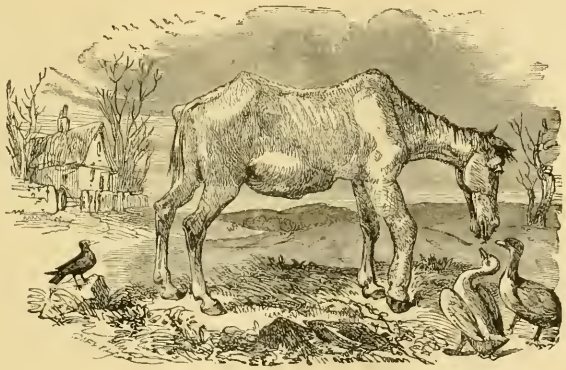
size for tender years, even if the colt is as large as he ever will be. The aloes may be given in a bolus the size and shape of your finger, and passed back into the throat with the right hand, while holding the mouth open with the left; or it may be given dissolved in a pint of warm water, with a bottle. Feed on bran mashes for a couple of days after taking the ball. After the ball has finished working, give a tablespoonful of the following mixture, night and morning, in the feed:

No. 33. 2 Ounces nitrate of potash,
2 Ounces rosin,
2 Ounces linseed meal,
Powder and mix.

No local treatment is needed, except to give all the necessary grooming the condition of the skin will allow.

XXI. Dropsy.

Causes.—Dropsy is rather the result of disease, or the result of a peculiar condition of the system, than a disease itself. It depends upon



CROW-BAIT—EFFECT OF DROPSY.

a debilitated condition, the result of other weakening diseases, especially of the kidneys, and starvation: it sometimes comes from diseased and irregular teeth.

How to know it.—It is manifested by swelling of the legs, belly, and sheath; languor; pallor of the visible mucous membranes; indifference to food; emaciation with weakness etc.

What to do.—It is of paramount importance to remove the cause the first thing; therefore examine the teeth, extract any that are decayed, rasp

off the sharp edges next to the cheeks; sometimes one gets broken, and the one opposite, having none to wear against, grows long and sticks directly into the gum, making mastication very difficult and painful—in this case, rasp or saw it off. If the cause lies in a debilitated condition from some other disease, tonics are indicated. If the appetite is good, give the following powder:

No. 34.
1 ½ Ounce pure sulphate of iron,
1 Ounce nitrate of potash,
2 Drachms fœnugreek seed,
2 Ounces linseed meal,
Powder and mix.

Give a tablespoonful night and morning in soft feed. If there is not sufficient appetite to take medicine in the feed, give the following:

No. 35.
1 Ounce tincture of iron,
1 Ounce tincture of gentian,
Water to make twelve ounces.
Mix.

Give one ounce (two tablespoonfuls) three times. Tempt the appetite with whatever he may fancy; sometimes when a horse won't eat oats he will eat corn or apples, carrots, cabbage leaves, etc. Continue the tonics till all signs of dropsy are gone, and give gentle exercise as soon as the strength of the horse will allow.

XXII. Chordes.

This is a name applied to cramps of the muscles of the neck and loins; it is of a rheumatic nature, and is most common in spring, fall and winter.

Causes.—Exposure to cold and damp by sleeping on the ground in wet, cold weather.

How to know it.—It may be known by swelling of the muscles of the affected parts, tenderness on pressure, neck twisted around towards one side, and is stiff, so that the horse cannot feed off the ground. The horse under these circumstances is stiff and sore all over.

What to do.—Apply hot rags, wrung out of very hot water, and laid on the sore muscles. Keep him warm and in a dry place. Give one of the following powders in soft feed three times a day:

No. 36.
1 Ounce colchicum seed,
1 Ounce nitrate of potash,
2 Drachms fœnugreek seed,
Mix.

Divide into twelve powders. Give gentle exercise.

XXIII. Hernia.

Hernia or rupture is the breaking away of the parts that contain the bowels, sometimes in one place and sometimes in another. The different hernias are named from their location: Scrotal hernia is rupture into the scrotum, and the bowels pass down through the abdominal rings into the scrotum; this only occurs in stallions. Inguinal hernia is rupture into the groin through one or both abdominal rings. Ventral hernia is when the abdominal walls are ruptured and let the bowels through into the skin; this is most liable to grow to enormous size. Umbilical hernia is rupture through the opening through which passed the cords during fœtal life, and which never has closed.

Causes.—The last mentioned one is from a natural defect; the others are from blows, kicks, great strains in jumping, pulling, falling, and in the case of the stallion, it is usually caused by the exertion peculiar to his labor.

How to know it.—There is a soft, puffy swelling on a surface that ought to be smooth; it is easily pushed back and remains so as long as pressure is maintained. Scrotal hernia is found in the scrotum; the scrotum is larger than it ought to be, and the hernia is often attended by very serious results, such as colic, strangulation of the gut, inflammation of the bowels in that region, mortification and death. Inguinal hernia is found in the groin or flank, and is nearly as bad as the scrotal. All the different kinds of hernia are liable to fatal termination as described for the scrotal. Sometimes the omentum or caul (the membrane holding the bowels together) only is protruded; then it is not so bad and not liable to a fatal termination unless the opening enlarges and allows the bowels to protrude too.

What to do.—Try and reduce the hernia by pushing it back; then introduce skewers crosswise through the skin over the opening, and wind silk around the skin, below the ends of the skewers, middling tight; then put on a compress and give the part considerable pressure. If this is not successful there are other operations, such as opening the skin and sewing up the opening in the abdominal wall with catgut sutures; injecting salt and water under the skin, etc. But these all require the skill of the veterinary surgeon.

Scrotal hernia is the hardest to overcome, and nothing but castration will do it in some cases. Introduce the hand into the rectum and endeavor, if possible, to remove the gut from the hole leading to the scrotum. This done, put the horse in a stall where the hind legs stand the highest, and feed on concentrated food, with as little bulk as possible, and give perfect rest. If this fails, he will have to be castrated by using the clamps and enclosing the external coverings of the cord, except the skin.

XXIV. Warts.

Description.—Warts are small, rugous, mammillary tumors of very little vitality. They may come on any part of the body, but usually come in the greatest numbers and most frequently on the head. They are composed of filaments that are semi-fibrous, and are rooted in the skin. Sometimes they are tough and hard; at other times they are soft, and bleed easily. They are flat or pedunculated.

HEAD COVERED WITH WARTS.

What to do,—If they are pedunculated, clip them off with a pair of scissors, or tie them off with a silk thread; then, when done bleeding, cauterize them with lunar caustic, or touch them with a red-hot iron. The latter may be resorted to, to stop the bleeding if necessary. If they are flat, burn them with nitric acid once a day, till they are destroyed. When well burned down, grease them once a day with fresh lard. It may be added that attempts at charming them off do not generally succeed.

XXV. Rat-Tail.

This is loss of the hair of the tail, from disease, destroying the hair follicles, and leaving nothing to reproduce hair from: consequently it is incurable. It is called rat tail, from its resemblance to the caudal extremity of a rat. Sometimes a rat tail is not so bad but that it will pass for a light tail, and sometimes there are only half a dozen hairs, nearly ruining the appearance of an otherwise good looking horse.

XXVI. Itchy Tail.

This is an itchy condition of the tail at its origin or dock.

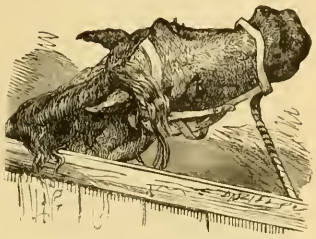
Causes.—It is caused either by filth, surfeit, worms in the rectum, mange, or some other parasitic disease.

How to know it.—The horse is continually rubbing his tail against posts, the fence, or anything he can reach, till he rubs off nearly all the hair from the dock.

What to do.—Wash it well with soap and water once a day, and saturate the hair with a strong lotion of salt each time. If that does not cure, give injections of salt and water, and apply lotion No. 24, to the tail three times a day. If that does not effect a cure, give the horse a purging ball, No. 23; and use lotion No. 32 on the tail.

XXVII. Itchy Skin.

This is scientifically known as prurigo. It is an itchy condition of the skin all over the body, which sometimes makes the horse almost frantic, rubbing, scratching and biting himself continually.



SHOWING SIGNS OF PRURIGO.

Causes.—It is one form of surfeit when not due to mange or hen lice, and is caused by a heated, surfeited condition of the body, which manifests itself in this manner.

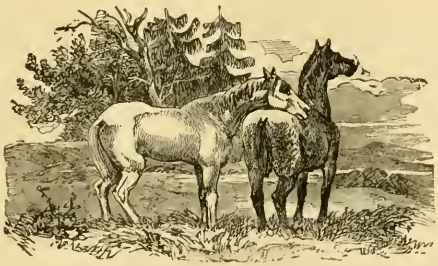
What to do.—Give the horse a purgative, No. 23, and when he has finished purging, give a tablespoonful of the following, in bran mashes morning and night.

No. 37.
4 Ounces Epsom salts.
2 Ounces nitrate of potash
4 Ounces linseed meal.
Mix.

Wash him all over with soap and water, and when dry, sponge him over with vinegar. If practicable, give green food for a month.

XXVIII. Melanosis.

This, although a constitutional disease, is only seen to be recognized during life, on the surface of the body, therefore it will be described in this chapter.



PREDISPOSED TO MELANOSIS.

Color and class of horses usually affected with melanosis.

Melanosis is considered to be a species of cancer. It is a black tumor forming on any part of the body—in the lungs, liver, muscular and areolar or connective tissue. It is, in the latter, immediately under the

skin that it is found during life in the horse; usually around the tail. Pus cavities and abscesses are apt to form around them. One fully six inches deep, and located under the tail was seen by the author lately.

They seem to be confined to white horses; even grays are not afflicted with them.

Causes.—The cause lies in the blood—in the form of a predisposition to cancer.

MELANOSIS.

Dock of a horse afflicted with melanosis, showing loss of hair as an effect of the disease.

How to know it.—Black tumors form under the skin but show through quite distinctly; they are usually flat and irregularly round, about half an inch or an inch thick, sometimes not larger than hickory nuts, and sometimes they are seen the size of a man's hand. Nasty, disagreeable sores often form around them.

What to do.—When they first make their appearance, they can be cut out with perfect safety. If sores form, clean them out, scarify the surfaces and dress them with lotion No. 5, three times a day. Give internally the following mixture:

No. 38.

2 Ounces potassium iodide.
1 Pint water.
Mix.

Give two tablespoonfuls morning and night, in a bran mash. Continue this for about three weeks; then omit two weeks and repeat.

XXIX. Hide Bound.

Causes.—Hide bound is the effect—not the disease itself—of some derangement in the system, that interferes with the general health, and gives rise to a generally unthrifty condition. It may be due to indigestion, diseased teeth, exposure to cold, and starvation. Abuse is a common cause; no horse can thrive and look handsome that is pounded, jammed and banged around.

How to know it.—The skin is as tight on the body as a glove on the hand, and the hair all stares the wrong way. A thin condition is usually an accompaniment of hide bound. The hair is dry, and skin dirty—full of dandruff.

What to do.—Remove the cause—if exposed to cold storms, shelter him. Examine the teeth, and if the edges of the molars are sharp, rasp them off with a rasp for the purpose. If starvation be the cause, feed better, and the skin will begin to loosen as soon as the horse begins to thrive, and will become oily and soft. If the manure has a strong smell, give him a purgative, No. 23, and a teaspoonful of saleratus in soft feed, once a day, for a while. Give regular exercise.

XXX. Eczema.

This is the name applied to a scabby, pimply condition of the skin.

Causes.—Heat, either from the sun, or fever in the skin from getting wet and the sun coming out hot and scalding the back, or getting wet and remaining so a long time in the fall, this chills the skin, and the fever is the reaction and eczema is the result.

How to know it.—The skin is covered over the neck, back and hips, and sometimes over the belly and sides, with scabs usually about the size of your little finger nail, and as thick as they can stand, giving a rough, pimply appearance and feel to the skin. It seems to cause no inconvenience, not affecting the health at all, nor even to cause itching.

What to do.—Treatment is unnecessary, for as soon as the horse is sheltered from the sun in summer and storms in the fall, the scabs will gradually come off. Grooming will assist in removing them. When they are removed the hair has a rough, dirty appearance for a few days, but will soon regain its smoothness and luster.

CHAPTER IX.

DISEASES OF THE RESPIRATORY ORGANS.

I. TUMOR IN THE FALSE NOSTRIL.—II. POLYPUS.—III. CATARRH.—IV. NASAL GLEET.—V. LARYNGITIS, ROARING AND WHISTLING.—VI. QUINSY.—VII. BRONCHITIS.—VIII. PNEUMONIA.—IX. HEAVES.—X. CONGESTION OF THE LUNGS.—XI. PLEURISY.—XII. HYDROTHORAX.—XIII. CHRONIC COUGH.

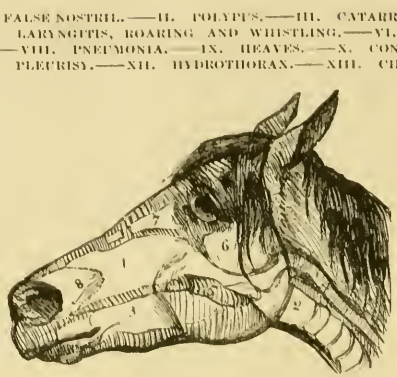


DIAGRAM SHOWING RESPIRATORY ORGANS IN THE HEAD OF A HORSE.

1.—The nostril leading direct to 2.—The larynx, situated at the commencement of the windpipe. 3.—The tongue. 4.—The œsophagus or gullet. 5.—The soft palate, which lies upon the tongue and affords a resting-place whereon reposes the epiglottis, or the guardian cartilage to the entrance of the larynx (2). 6.—The guttural pouches, or large membranous and open sacs, containing nothing but atmospheric air. 7.—Nasal or frontal sinuses. 8.—The false nostril.

I. Tumor in the False Nostril.

The false nostril is the small pouch or *cul de sac* on the outer side of the lower edge of each nostril. Tumors are liable to form in these, and partake more of the nature of abscesses, in that they are filled with pus of a cheesy consistency, but are tumors in that they form slowly and do not point and break like an abscess. They are usually about the size of a hen's egg; they are not sore, but cause more or less wheezing in the breathing on account of the diminished capacity of the air passage.

FACE OF HORSE.

Showing appearance of muzzle when there is a tumor in the false nostril.

How to know it.—A small swelling will be apparent on the outside, but the main dependence is to be placed upon the examination of the nostril, when it will be found to be nearly closed by the tumor in the false nostril.

What to do.—It can be opened without the slightest danger. Insert the knife inside the nostril and make a free opening and evacuate the pus. Inject lotion No. 6, twice a day. It is not likely to recur.

II. Polypus.

This is a tumor-like excrescence growing in the nostril. It may form in any part of the passage from the muzzle to the throat. It is usually a fleshy bulb, on a pedestal or neck. It varies in size from a cherry to a man's fist.

FORCEPS.

For grasping the polypus for removal.

POLYPUS.

Hanging from the upper part of the nostril.

How to know it.—The breathing is obstructed, to a certain extent, and, upon examination, the polypus is found.

What to do.—Cast the horse, and catch firm hold of it with the forceps for the purpose, then pass the chain of an *ecraseur* over it, and cut it out close to the surface from which it grows. A fine copper wire may be used, if the *ecraseur* cannot be had; pass the wire over the polypus and twist it off. There will not be hemorrhage to do any harm. The polypus may grow again, but it is not very likely to.

III. Catarrh.

Under this name are included acute catarrh and the common cold when it is confined to the nose. It is simple in itself, but all inflammations of the upper air-passages are liable to run down into the lungs and cause bronchitis and pneumonia, which are always serious. Catarrh is inflammation of the mucous membrane of the nostrils, and often extends to the sinuses of the head, especially the frontal sinuses situated between the eyes.

A HORSE'S HEAD WITH COLD.

Causes.—Exposure to cold winds, rain and snow storms, cold nights, etc.

How to know it.—There is always a discharge from one or both nostrils. The discharge is thin watery mucous at first, and turns to muco-purulent in the course of a couple of days; and then to purulent, if not properly treated. The muco-purulent is white and frothy; the purulent is yellow, and has an offensive

odor. In bad cases, there is considerable fever, loss of appetite, and redness of the eyes. If neglected, and nature is not vigorous enough to throw it off, it becomes chronic, and is known as nasal gleet. Sometimes the lymphatic gland, under the lower jaw, enlarges.

LYMPHATIC GLAND OF THROAT SWOLLEN.

1—The enlarged lymphatic within the jaw.

What to do.—Remove the cause; if exposed to cold storms, shelter the animal, put on a blanket if necessary, feed on soft feed, give a teaspoonful of saltpetre in a bran mash night and morning. If that does not perform the work satisfactorily, give the fever mixture, No. 4. If there is much fever and loss of appetite, give No. 18. In all bad cases, give rest till the horse is better. If the attack is prolonged to a week or more, during convalescence, give the tonic No. 22, and syringe the nostrils out, two or three times a day, with the following lotion:

No. 39.

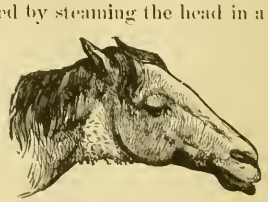
2 Drachms carbolic acid,
1 Pint of water,
Mix.

NOSE BAG.
For steaming horse with cold.

Apply the blister No. 41 to the throat, letting it go well up towards the ears. If the skin is not mildly blistered with one application, repeat it after twenty-four hours; then grease it once a day with fresh lard. When the discharge does not come freely, it can be helped by steaming the head in a bag of hot bran.

IV. Nasal Gleet.

This is the name given to chronic catarrh, and is always complicated by extension of the disease to the sinuses of the head, often causing the bone over the one affected to bulge out, as if swollen.



A HORSE WITH THE THROAT BLISTERED.

Causes.—Neglected or obstinate catarrh, that will not yield to treatment with an ordinary amount of perseverance, are the only causes. The sinuses of the head are all in communication with each other by tubes and passages. When inflammation extends to them, the swelling of the mucous membrane closes these passages, and confines the pus with suffi-

cient force to cause the bones to bulge out, but there will be a constant flow of pus from the nostril, sufficient being forced through the passage by the pressure to keep up the discharge.

How to know it.—The general health is not in the least affected, except, perhaps, in long standing cases. There is a continual flow of thick, offensive, yellowish matter that will usually sink in water. One nostril usually runs more than the other, and oftentimes the chronic trouble is entirely confined to one side. The face between the eyes will be found to be full, giving a dull, solid sound when tapped on each side of the median line running down the centre of the face. In long standing, bad cases the bone of the face, referred to above, will be bulged out, and great pain evinced when tapped.

Pus is, naturally, the blandest secretion of the body; but being confined, it corrupts, and then smells abominably. The facial sinuses formed in nasal gleet, open to the nostrils on either side by two comparatively small flaps, slits or valves. These are their only means of communication with the external atmosphere; and through these valves all the pus must flow. It is not surprising that such structures occasionally become clogged, till the accumulated secretion, or the increased breathing, or the position of the head, obliges the passage to give way.

What to do.—If the sinus is full, there is no cure for it without the operation of trephining to remove a portion of the bone, to evacuate the sinus, and give local treatment; but if there is no bulging of the bone, it may be cured by syringing out the nostril with warm water to clean it, then injecting a little of lotion No. 39 with a long-nozzled syringe, using considerable force to cause a spray when it strikes the back of the nose. Repeat this, morning and night, for a month or so, and give internally, No. 34. The operation of trephining the frontal sinus, will be found described in the chapter on operations.

NASAL GLEET. Horse affected with nasal gleet and bulging of the frontal sinus.

All treatment, except the operation, may be continued and the horse kept at his work, unless he is laid up on account of the appearance of the nostril, as it looks very bad to drive a horse with a chronic discharge from the nose.

V. Laryngitis, Roaring and Whistling.

This is what is ordinarily known as sore throat. The inflammation lies in the lining of the larynx—that is, the cartilaginous box in the throat, which is the upper end of the windpipe or *trachea* containing the vocal cords, and is the seat of roaring.

Causes.—Exposure to cold winds and storms, standing in drafts when warm, neglect when coming in when warm from work, and extension of catarrh from the nose. The cause of roaring is chronic inflammation of the mucous membrane lining the larynx, diminishing the air passage so that when he is unable to get sufficient air, and forcing it through the small passage, makes the noise.

EFFECT OF LARYNGITIS.

A horse trying to drink, the water returning by the nose.

How to know it.—The throat is usually swollen on the outside, but sometimes only on the inside, and is tender upon pressure; the nose is protruded; he has great difficulty in swallowing, and often, when drinking, the water will come back through the nose nearly as fast as it goes into the mouth, and what is swallowed is forced down with an effort. There is usually a short, painful, subdued cough, dry at first, but getting more moist after a couple of days.

What to do.—Clothe warmly; shelter from cold storms and drafts; rub mustard paste well into the throat on each side, well up towards the ears; feed on soft mashes, boiled oats, etc., and set a pail of water in the manger for him to play in to cool the throat and mouth. Give internally fever mixture No. 4, every two hours till the fever is reduced and the pulse lowered; then drop off to three or four times a day. If the swelling in the throat does not yield to the above treatment, apply a soft, hot linseed poultice to it, and change it once a day for a fresh one. The loss of appetite, or rather inability to eat, will soon disappear and recovery will be rapid.

In case of roaring, apply a smart blister of cantharides, No. 9, to the throat, and after three weeks repeat it. Inject a tablespoonful of the mixture No. 35, three times a day well back into the throat, and let the horse run at grass or feed on very soft food.

Bad, long standing cases of roaring are incurable. Whistling is similar to roaring, except in the noise produced; it is subject to the same causes and treatment.

Roaring and whistling are sometimes, but very rarely, the effect of paralysis of the nerves of the larynx, letting one or more of the cartilages drop into the box to a certain extent, and thereby diminishing the caliber of the air passage. Sometimes a small portion of the cartilage doing the damage can be removed, but it requires the skill of a qualified veterinary surgeon.

VI. Quinsy.

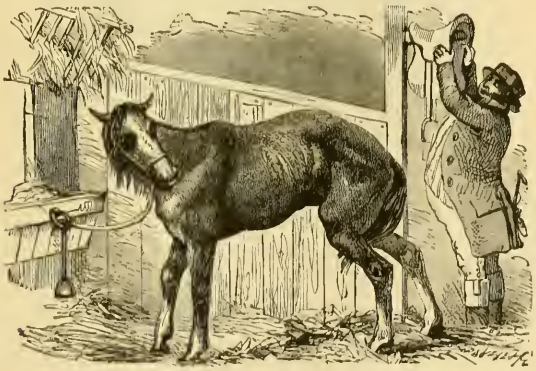
Causes.—Sometimes the inflammation in the throat in laryngitis is so great and deep seated that abscesses form in the throat, producing quinsy. It is caused by the same agents as laryngitis, and is always more prolonged in duration than simple sore throat.

How to know it.—It may start with all the symptoms of laryngitis but will not yield to treatment at first. The throat gets sorer and sorer from day to day, till suddenly the abscess bursts, and a tremendous flow of pus comes from the nostril, and the animal will be relieved at once. Quinsy lasts from one to three or four weeks, and is very apt to be followed by roaring or whistling.

What to do.—Apply the same treatment as prescribed for laryngitis. Continue the linseed poultices right through; apply them so as to cover the throat nearly to the ears, and keep them quite soft.

VII. Bronchitis.

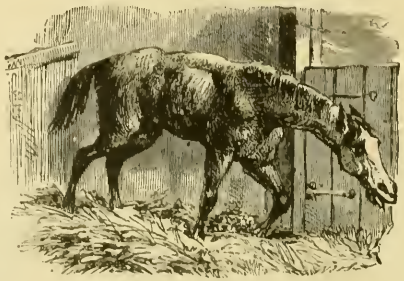
The bronchial tubes are the two branches of the trachea or wind pipe; they lead to the lungs. Inflammation of these branches, and also of the lining of the tubes as they ramify through the lungs, is known as bronchitis.



A FIT SUBJECT FOR FOUNDER OR BRONCHITIS.

Causes.—The same exposures that cause catarrh and sore throat are prolific agents in producing this disease. And there is a very great tendency in the horse to inflammations of the upper air passages which run down upon the lungs, so much so that many cases of catarrh and laryngitis terminate in bronchitis and pneumonia.

How to know it.—It is always ushered in with a shivering fit, but this fit is seldom seen, and if seen is thought nothing of by most people; the chill passes off and the reaction brings fever; the pulse runs up to fifty or sixty, is soft, full and bounding; temperature soon runs up to 102° or 103° F.; the breathing is hurried and the nostrils are distended. If pressure is applied to the chest just above the breast bone, pain will be evinced and a cough provoked, which is soft, deep and subdued, great pain being manifested while coughing; the horse is loth to move; if the ear is placed to the nostril a grunt will be heard with each breath; and if the ear is placed in front of the chest a thick, unnatural sound will be heard; the ears and legs are usually cold; the appetite is indifferent. All of these symptoms will be noticed in the course of ten or twelve hours. In the next twenty-four hours the pulse may run up to 70, and the temperature to 104° or 105°; the pulse will be soft and full; the cough will increase and the thick, heavy sound when the ear is applied to



A PAINFUL COUGH OF BRONCHITIS.

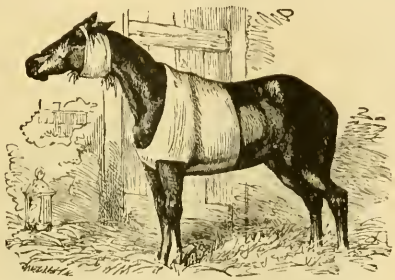
the breast will have run into a harsh, grating sound; the horse persistently stands; drinks considerable water, and the appetite will be lost in most cases; the mouth will be hot to the finger placed under the tongue; the breath is hot as it comes from the nostrils, and the urine is scanty and high colored. The horse may die from continuation of the inflammation and extension of it to the lungs proper, or may drown in the mucus that is secreted in the passages forming the next stage following the dry one; in this last a rattling bubbling sound is heard when the ear is applied to the chest above the breast bone, by the air rushing through the mucus.

Convalescence will be noticed by a diminution of the mucous rattle; falling of the pulse and temperature; return of the appetite; and a generally relieved appearance; ability to lie down and rest quietly, and the frequency of the breathing lessened.

What to do.—If seen during the chill, give two ounces of whiskey in a little water and follow it with No. 4, for the next twelve hours; then, if better, continue the same at longer intervals, but if worse, change it to the following:

No. 40.
1 ½ Ounce sweet spirits of nitre,
1 Drachm tincture of aconite root,
2 Drachms fluid extract belladonna,
1 Ounce tincture of gentian,
1 Ounce powdered saltpetre,
1 Ounce powdered sal ammoniac,
Water to make one pint,
Mix.

Give a wine-glassful every two hours till the horse is better, then drop off to three or four times a day. Set a bucket of water in his manger. Give scalded oats to eat; if he won't eat them try him with other things



A HORSE DRESSED FOR BRONCHITIS.

—a couple of ears of corn three or four times a day, carrots, apples, good hay, etc. Rub a little of the following liniment well into the sides over the lungs, and on the chest once a day till it is well blistered:

No. 41.
2 Ounces liquor ammonia,
2 Ounces spirits turpentine,
2 Ounces linseed oil,
Mix and shake.

When the blistering has been carried far enough, rub a little fresh lard well into the hair once a day to take out the scabs without pulling out the hair. If the skin comes off anywhere from the blister, apply No. 24 to the spot three times a day.

Give plenty of pure air to breathe, but avoid drafts and dampness; see that the drainage is good. Remove him from the other horses if pos-

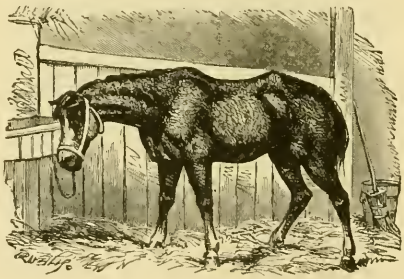
sible, on account of the vitiated air he would have to breathe in the stable with them.

When convalescence is well established, and there is much weakness, change the medicine to No. 18, but do not give it as often as every two hours, unless there is still a good deal of fever; three times a day is often enough in most cases.

When the fever is all gone, change the medicine to No. 35, if the appetite is poor, but if it is good, give No. 34 in the feed. Give gentle exercise when well enough to bear it. The horse should be well clothed, and the legs bandaged. Bring him back to his feed and work gradually. While wearing the bandages they should be removed morning and night, and the legs well rubbed and the bandages replaced.

VIII. Pneumonia.

This is inflammation of the lung tissue; oftentimes the right lung only is affected. Pneumonia is rather rare, at least it is far less common than bronchitis, and sometimes the two diseases are combined in the form of broncho-pneumonia.

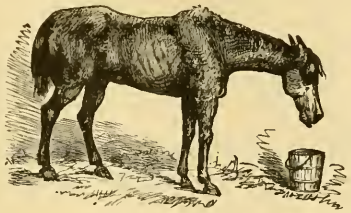


A CASE OF CONGESTION.

Causes.—The same as for other acute affections of the air passages.

How to know it.—The first stage is the shivering fit and sanguineous congestion, in which there is a rush of blood to the lungs; high fever follows the chill, the pulse runs up to sixty to eighty, and is soft and weak; the temperature is likely to run up to 105° to 107° Fahr. The breath is hot, and breathing labored and fast—respirations running up to twenty-five to thirty-five per minute; the ear being applied to the sides, the grating sound indicative of inflammation is heard; there is no cough; ears and legs are cold: the body heat is great, and the urine scanty and high colored.

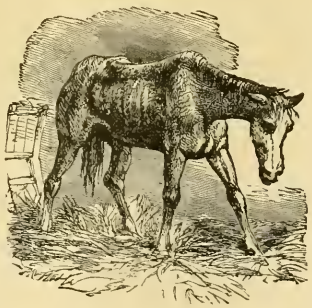
The second stage is that of hepatization, in which the lungs become solid, like liver; no sound is heard at all by the ear when applied to the side, and, when tapped, it sounds solid like a barrel when full of water—the natu-



HORSE WITH PNEUMONIA.

The appearance of a horse in the early stage of pneumonia.

ral sound when tapped being resonant, like a drum. The lower part of the lung being usually most affected, the breathing is floated upward, as it were, and becomes shallow; the breath becomes cold in consequence; the nostrils flap, and the horse thrusts his nose through the windows or doors of the stable in search of more air; the flanks heave; the ribs are worked violently in and out; the legs spread to stand in a braced position; the strength becomes exhausted, and the system suffocates for want of oxygen, and the animal usually dies in this stage.



THE POSITION ASSUMED BY THE HORSE DURING AN ATTACK OF PNEUMONIA.

If he lives through this stage, the third stage begins—that of absorption; in favorable cases this goes on to so great an extent that recovery is complete. Unfavorable cases fail to absorb the liver-like condition of the lung, and suppuration sets in; the whole diseased portion may turn to

pus, and be thrown up through the nose, where it has a grayish, lumpy appearance. This is the fourth stage, and is always fatal; the discharge is extremely offensive, attracting hosts of flies, and rendering a whole stable unfit for other horses to remain in.

In this, as in bronchitis, the horse never lies down till he is very much better, or nearly well.

What to do.—The same treatment prescribed for bronchitis will apply to this, and, in addition, during recovery, if weakness is great, give malt ale in pint drenches three times a day. If there is no appetite, put the ale in with oatmeal gruel, and give them as a drench together. Clothe him warmly, and give plenty of fresh air to breathe, but avoid a draft. It is a good plan, when feasible, to isolate him from all other horses.

IX. Heaves.

The lungs are made up of an innumerable quantity of small air cells, and the lung tissue is capable, to a great extent, of expelling the air from it, and drawing more in by virtue of the elasticity and contractility it possesses. Sometimes many of these cells become ruptured into one large cell, which destroys the contractility of that portion of the lung, in which case the diaphragm, ribs and abdominal muscles are brought into use to expel the air, giving rise to the second spasmodic, twitching effort seen in the flanks. This condition constitutes heaves, also known as broken wind.

Causes.—The most common cause is driving too fast, and keeping it up too long when the horse is not in condition—either having his stomach too full and not giving the lungs room, or the lungs themselves are weak from very light work, or entire disuse. Horses fed entirely on dusty Timothy hay, are more subject to it than those fed on prairie hay. A horse is more likely to get the heaves when driven fast against the wind than with it; the lungs get very full of air, immensely distended by the extra amount taken in, and if kept at that kind of work any length of time, the lung tissue gives way, and a rupture is the consequence.

How to know it.—Instead of the regular, easy breathing noticed in the flanks, there is a second effort made by the jerking of the muscles of the flank. When the ear is placed against the side over the lung, a whistling, wheezing sound is usually heard. When once begun it is very apt to increase, and often renders the horse useless.

What to do.—It is incurable, but it can be alleviated by careful feeding, giving as condensed food as possible, with a view of getting the greatest amount of nourishment in the smallest compass. Wet everything

he eats, to lay the dust. Give the following mixture twice a day in soft feed:

No. 12. 2 Ounces powdered lobelia seed.
2 Ounces linseed meal,
Mix.

Divide into eight doses; give one night and morning. When they are gone, wait a week and repeat it. Avoid giving too much, as it is apt to weaken the kidneys. Always drive a horse slowly that has the heaves.

BAD POSITION.

For head of horse affected with heaves; for it aggravates the difficult breathing.

X. Congestion of the Lungs.

Congestion, is always a precursor of inflammation of the lungs, but it sometimes comes on in such a way, as to need separate consideration. The pathology of it is turgescence of the lung tissue by stagnation of the capillary blood vessels and arterioles. Under favorable circumstances it improves, and total recovery is the result, but in bad cases it is very apt to run on to inflammation of the lung tissue, and a case of pneumonia is the result.

Causes.—Over exertion when not in condition to take it; the system is fat; the blood is rich and fat; the lung tissue is weak from want of use during longer or shorter periods of idleness. When in this condition, the horse is taken out, perhaps, once a week, and the driver thinks because he has had so long a rest, he ought to be able to go faster than if he were out every day, and sends him through to beat the crowd. Congestion of the lungs is quite frequently the result. This is oftener seen in the old country among the hunters, but is not infrequent in this country among the gentlemen's road horses. From the contraction of the muscular tissue, the blood is thrown inwardly to the lungs, liver and spleen; the lung tissue becomes fatigued, and the small blood vessels surcharged with blood to such an extent as to interfere with the circulation.

How to know it.—The horse suddenly stops, all out of breath; nostrils distended; the countenance has a look of anxiety upon it; he looks around as if in search for more air; paws the ground in his endeavor to breathe, and acts generally as though suffocation were near.

What to do.—Let him stop; turn his head towards the wind; loosen all harness that interferes with the free expansion of the chest and passage of air to the chest; let down the check rein; loosen the throat lash; remove the collar or breast plate and girth; and a small stab of the knife in the roof of the mouth to draw a little blood may assist in restoring the circulation. As soon as he is sufficiently recovered, take him home quietly

and place him in a comfortable loose box; give him a sponge bath with alcohol and plenty of friction from head to foot; also cold water to drink in small quantities, and give recipe No. 30, in a little water, till the breathing and circulation are normal. If it does not yield to this treatment, and pneumonia is inevitable, adopt the treatment prescribed for that without delay, and apply it vigorously. Approaching pneumonia will be noticed by a rise in temperature. If the temperature goes above 101 ° Fahr. and the breathing continues labored, look out for pneumonia.

Prevention.—Feed a horse according to his work. If he is doing daily hard work there is very little danger of overfeeding, but if the work is light and little of it, feed sparingly on heavy grain. Give daily regular exercise. There is very much less danger of derangements if the horse goes out every day than if he only goes out once or twice a week, and he is able to do ten times the work from the fact that he is in a strong, vigorous condition—muscular without being fat.

XI. Pleurisy.

The lining of the chest and coverings of the lungs are serous membranes that secrete a serous, slippery moisture that prevents friction by rubbing of the lungs against the ribs—called the *pleura*. Inflammation of these serous membranes is known as pleurisy. It is attended with great pain, and is often followed by hydrothorax or filling of the chest with water, which is generally fatal. Pleurisy may exist alone or with pneumonia; then it is called pleuro-pneumonia.

Causes.—Any sudden exposure to cold rains; drafts in the stable, especially if the horse comes in warm. It would be very prevalent if the inflammation in these parts did not go to the feet by metastasis as often as it does. See founder or laminitis.

How to know it.—The horse has a chill, followed by high fever; great pain in the chest, shown by colicky pains; nose turned around towards the chest frequently; ears and legs are cold; breathing hurried; pulse quick, from 50 to 75 per minute; temperature raised three or four degress; elbows turned out, and a line along the lower edges of the ribs denoting a fixed position of them to prevent friction in the chest; loss of appetite; great pain evinced upon pressure with the fingers between the ribs; a grating sound heard by the ear applied to the sides, made by the rubbing of the parts internally, which are rendered dry by the inflammation.

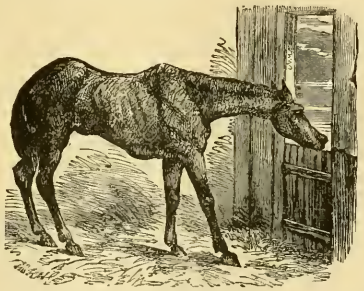
If recovery takes place, it is usually within four days; but if it continues longer than that, effusion takes place, and the chest begins to fill with water, floating the lungs up and forming hydrothorax. If the chest does not fill more than one-third, it will usually absorb, and he will recover; but if the chest fills more than one-third full, it is usually fatal.

What to do.—If seen during the chill, put on blankets; shelter from the cold air, and give half a teacup of whiskey in a little water, and follow it with receipe No. 40, giving a dose every two hours till he is better; set a pail of water before him, and feed lightly. Rub the liniment, No. 41, well in to the sides, and, after six hours, repeat it. When the fever is broken, change the prescription to No. 18. When convalescence is well established, give receipe No. 22.

XII. Hydrothorax.

Causes.—This is a filling of the chest with water, following pleurisy.

How to know it.—The horse has been enduring great pain all through the attack of active inflammation, but as soon as effusion begins, and the chest begins to fill with water, the pain is relieved; he brightens up, commences to eat, and is more comfortable, till the water floats the lungs up and interferes with the breathing. Then the countenance becomes haggard and anxious; breathing short and fast; breath cold, from shallow, bronchial respiration; the extremeties are cold; pulse very high, from 80 to 150 per minute; tapping on the sides will produce the solid



HORSE WITH HYDROTHORAX.

Showing the distension of the nostrils, heaving of the flanks and dropsical swelling around the chest.

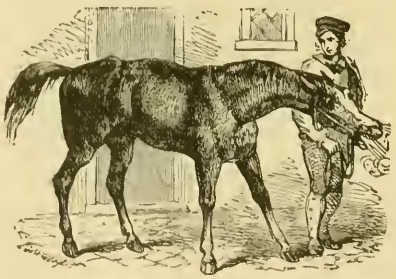
sound of a barrel full of water; the ear placed to the side will fail to detect the customary respiratory murmur; there will be lifting of the loins and elevation of the back at each effort at inspiration, that is, drawing breath in; the ribs bulge outward; dropsical swellings appear under the chest and belly; the head is extended; there is flapping of the nostrils; regurgitation of the blood in the veins; splashing of the water is heard in the chest when it reaches the heart; the pulse gets smaller and smaller; breath shorter and shorter, till he drops suffocated, as completely drowned as though he were pitched into the lake.

Favorable symptoms are lessening of the effusion in the chest; improvement in the breathing and pulse; return of healthy appetite, etc. But recovery is slow, and complete recovery is seldom realized, for the lung is apt to grow fast to the ribs, and stitches in the side attack him during active exercise.

What to do.—Put him in a comfortable place, dry, warm, and well-ventilated, but no drafts. Clothe warmly, and bandage the legs. If the sides have not been well blistered with receipe No. 41, apply it immediately, and repeat it every six hours, till the sides are well-blistered, and give No. 18 internally, every two hours, very persistently; if he eats nothing, drench him with oat-meal gruel. If the chest continues to fill it may be tapped, the operation being called *paracentesis thoracis*, directions for which may be found in the chapter on operations.

XIII. Chronic Cough.

Causes.—When the inflammation of the mucous membrane of either the larynx or bronchial tubes becomes chronic, the irritability of it remains and the smallest thing will produce a cough, and sometimes a fit of coughing that may last several minutes. Dust in the hay or oats, or breathed in while on the road, sudden gusts of air, pressure of the collar or throat lash, or pinching of the throat with the hand will excite the cough.



THE ACT OF COUGHING.

How to know it.—Coughs are efforts of nature to free the breathing apparatus of irritants, and they differ according to the part affected and the extent of the affection. The healthy cough is strong, full and usually followed by a sneeze to clear the nose. The throat cough is a lighter, shorter, hacking one, while that of the chest is a hollow, deep, resonant cough, except in the acute, painful stages of bronchitis, when it is almost noiseless from being so much subdued.

What to do.—Chronic cough is almost incurable when long standing, but in the more recent cases good treatment will benefit and oftentimes

cure. If the cough is recent, apply recipe No. 41 to the throat, well rubbed in all around and up towards the ears. Give internally the following powders:

No. 43.
1½ Ounce gum camphor,
1 Ounce digitalis,
2 Ounces linseed meal,
Powder and mix.

Divide into twelve powders and give one night and morning in soft food. If one course does not cure, repeat it. If that proves ineffectual, apply blister No. 9 instead of No. 41, to the throat and give Prof. Dick's recipe as follows:

No. 44.
1 Drachm camphor,
1 Drachm digitalis,
1 Drachm calomel,
1 Drachm opium,
Mix in a ball with syrup.

Give it as one dose; repeat it once a day for a week, then rest a week and repeat.

If the cough is very troublesome and the appetite is poor, give the following:

No. 45.
2 Drachms diluted prussic acid,
1 Ounce tincture of camphor,
3 Drachms fluid extract belladona,
1 Ounce tincture gentian,
1 Ounce chlorate of potash,
Water to make one pint,
Mix.

Give one ounce three times a day, with a syringe; open the mouth with one hand and shoot it well back into the throat. Do not attempt to hold a horse's head up to drench him with anything else than oil when he has a cough; for it is apt to irritate the throat and might choke him.

For the treatment of coughs accompanying catarrh and laryngitis refer to them. If the above treatment fails, we would recommend the insertion of a seton under the skin of the throat and a long run at grass, if practicable. Leave the seton in three or four weeks; wash it nice and clean once a day with hot water. Sometimes a run at grass will do more for a bad cough than all the medicine in the world.

A SETON IN THE THROAT OF A HORSE.

If the cough appears to come from the chest, and pressure in the hollow just above the breast bone aggravates it, apply the blisters there, and give the same treatment otherwise as for the throat.

CHAPTER X.

DISEASES AND ACCIDENTS OF THE ALIMENTARY CANAL.

I. TEETH—ACHE, DECAY, FILING—WOLF TEETH.——II. TONGUE LACERATION.——III. SORE MOUTH.——IV. LAMPAS.——V. PHARYNGITIS.——VI. CHOKING.——VII. GASTRITIS.——VIII. STOMACH STAGGERS.——IX. DYSPEPSIA.——X. SPASMODIC COLIC.——XI. FLATULENT COLIC.——XII. RUPTURE OF THE STOMACH, INTESTINES OR DIAPHRAGM.——XIII. CONSTIPATION.——XIV. DIARRHŒA AND SUPERPURGATION.——XV. DYSENTERY.——XVI.——ENTERITIS.——XVII. PERITONITIS.——XVIII. CALCULI.——XIX. INTUSSUSCEPTION AND GUT TIE.

I. Teeth—Ache, Decay, Filing—Wolf Teeth.

Causes.—Derangements of the teeth very frequently lead to grave difficulties, both local and constitutional. The teeth often become decayed, holes form in them, and tooth-ache is a common occurrence.

How to know it.—It will be detected by the horse holding his head on one side while chewing, turning his head first one way then the other, as if trying to remove food from a sore tooth, and doing the same when drinking, if the water is very cold. The disease often extends up the tooth, or starts in the form of ulceration on the fang, and breaks out into the nose, causing a discharge from the nostril on the side on which the rotten tooth is located. A chronic discharge from a tooth is often mistaken for nasal gleet, and sometimes for glanders, on account of the disagreeable odor, which will be recognized as that characteristic of diseased bone.

A HORSE WITH TOOTHACHE.

Sometimes the ulceration, when of a lower tooth, breaks out at the angle of the lower jaw, and sometimes extends to the root of the tongue and to all the soft tissues between the branches of the lower jaw; in one instance that came under the notice of the writer, the disease proved fatal to a valuable horse.

The teeth frequently get broken by chewing on stones taken up with oats, and when one molar tooth gets broken off, the opposite tooth, not having anything to wear against, gets very long and sticks into the opposite gum, and makes mastication very painful. The edges of the molar teeth get sharp from the fact that they wear bevelling—the edges must necessarily sharpen as they wear; the upper rows bevel downwards and outwards, the edges cutting the cheeks, and the lower rows bevel upwards and inwards, cutting the tongue.

The broken and sharp teeth make mastication not only painful, but almost impossible, consequently the horse bolts the food half chewed, which causes indigestion, colic, dyspepsia, hidebound, emaciation, etc., any of which may run on to a fatal termination. The food is frequently quidded and dropped into the manger.

A HORSE QUIDDING.

Colts, when shedding their teeth, often suffer a great deal from sore mouths, which causes them to look rough and scaly until the old teeth are shed, and new ones grow.

What to do.—In case of a discharge from the nose, always examine the teeth, and if any are decayed so as to cause the trouble, remove them. If a tooth extends below the others on account of the opposite one being broken, file it off even with the others. If the edges get sharp, so as to scarify the cheeks and tongue, file them off round. There are files made expressly for that purpose. The edges only need filing; the surfaces get very rough, but that is intended to be so by nature; it is her millstone to grind the grain; and the arrangement of the tooth material is such that the more it wears the sharper it gets.

In case of a parrot mouth, where the upper incisors project over the lower ones, the horse is unable to graze, and the mouth, as far as age is concerned, presents a horrible appearance, passing for double the age he really is. Either file or saw them off even with the lower row.

PARROT MOUTH.

Wolf Teeth.—These are small, insignificant teeth, that come immediately in front of the upper rows of molars. It is a popular idea that these affect the nerve running to the eye and cause moon-blindness, weak eyes, etc. But it is a whim; they do no possible harm, except, perhaps, to wound the cheek by its being pulled against the wolf tooth by the bit. But they do no possible good, and, consequently are just as well, and a little better, out. Take a pair of blacksmith's pinchers and pull them out. They are usually only in the gums, and come out easily. When the new teeth of colts come before the old ones are out, the old ones should be removed, to make room for the new.

II. Tongue Laceration.

Causes.—The tongue is sometimes bitten by falling and striking on the mouth; torn with the halter chain, or by being pulled forcibly out of the mouth on one side, being cut against the sharp molar teeth.

What to do.—Wounds on the tongue heal readily. If the end is torn half-way off, or less, it will heal, but will not grow together, but may be left, and no inconvenience will be felt; but if it is more than half torn off, it will be found advisable to cut it clear off. Dress wounds of the tongue with the following lotion:

No. 46.
1 Ounce borax,
1 Ounce honey,
1 Pint water,
Mix.

Dry the sore with a sponge, and rub on the lotion three times a day.

Sometimes it is necessary to amputate the tongue, on account of wounds and accidents. It is quite feasible, but requires the skill of a qualified veterinary surgeon.

III. Sore Mouth.

Causes.—The mouth is often made sore by the bit, by caustic substances in the food and medicine, by too hot mashes, etc. The bit often excoriates the angles of the mouth, and, if allowed to continue doing harm, the mouth soon becomes caloused, and loses all sensibility. Sometimes the bit injures the lower jaw bone so as to kill a portion of it, when it will become a foreign substance and slough out, leaving a very sore mouth.

SORE MOUTH.

With the angles excoriated by the bit.

SORE MOUTH.

With the angles and cheeks swollen, caloused and insensitive.

This is most often seen in violent pullers and when the curb bit is used. The oval portion of a curb bit often presses upon the roof of the mouth and does a great amount of injury.

INJURY BY THE BIT.

A mouth with the bone badly injured by the bit, the left side being much swollen around the tusk.

How to know it.—When any portion of the mouth is swollen and sore, examine it carefully and locate the cause if possible. When the bones or roof of the mouth are injured, there will be great soreness and some swelling.

MISUSE OF CURB.

The roof of the mouth injured by the curved part of the curb bit.

What to do.—Remove the cause, that is, leave the bit out of the mouth for several days. If the angles of the mouth are raw, apply recipe No. 32 three times a day. If the bones are injured and exposed apply No. 39 three times a day;

if the flesh is not broken it would be advisable to scarify it to allow it to break through the tough skin more easily, and examine it carefully each day to see when the dead piece of bone is loose, and remove it. Then dress the wound with the same lotion, (No 39) till the bone is covered by healthy granulations, then dress it with No. 46. Do not use the bit in such a mouth under two months at least.

SCALDED MOUTH.

From giving strong caustic medicine pure.

When the mouth is scalded by giving strong medicine, pure, instead of diluting it as directed on the label, the whole inside of the mouth will be found to be swollen, red, and if very bad, will skin in spots. Swab it out with recipe No. 46 three times a day.

IV. Lampas.

This is an imaginary disease. It is supposed by most people that when a horse does not eat he must have the lampas, and they proceed to

BURNING FOR LAMPAS.

LAMPAS IRON.

The old time instrument of torture.

burn out one or two of the bars in the roof of the mouth which are placed there by nature to prevent the food dribbling from the mouth, which it would do were it not for these bars in the roof of the mouth. They all point or turn backwards towards the throat, and have a tendency to work the food back. It is the same in the human mouth.

Sometimes the one or two bars nearest the incisors become inflamed, especially with colts when teething.

What to do.—If the bars are red instead of a bright flesh color, and extend below the teeth, take a pen knife and scarify them gently; this will be sufficient. Never countenance the burning nor any other barbarous practice.

V. Pharyngitis.

That portion of the œsophagus or gullet that lies in the throat, above the larynx is called the pharynx. Inflammation of it is pharyngitis.

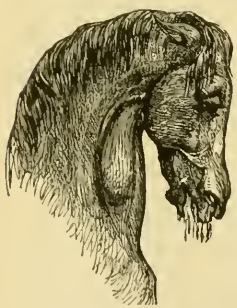
Causes.—It is usually caused by some foreign substance lodging there or by extension to the pharynx of inflammation from the larynx and nasal chambers. It is usually associated with pharyngitis and catarrh, strangles, quinsy, etc.

How to know it.—Painful swallowing, and sometimes a total inability to swallow is seen; the water returns by the nose while drinking, and the food is quidded. More or less enlargement of the throat and glands on the outside, tenderness upon pressure, and the neck straightened and the head extended, will be the symptoms usually noticed.

What to do.—If any foreign substance is suspected, examine the throat and remove anything that may be found. Apply a counter irritant in the form of the recipe No. 41. Give internally, mixture No. 21. Feed on soft feed, such as scalded oats, boiled barley, bran mashes, etc. If it continues longer than a week, give oat meal gruel injections—two quarts every four or five hours. Cook the gruel the same as for the table.

VI. Choking.

Causes.—Horses very seldom get choked; but in some instances they bolt their food, especially when fed on dry ground feed, and swallow it before it is properly moistened with saliva, and it accumulates in the gullet sometimes as large as your double fist, usually about six or eight inches from the throat. It often gives rise to a great amount of flatulence. Sometimes it leaves a sac in the gullet, from the distension of the fibres of its walls; the sac is called *dilatation* of the *œsophagus*.



CHOKING.

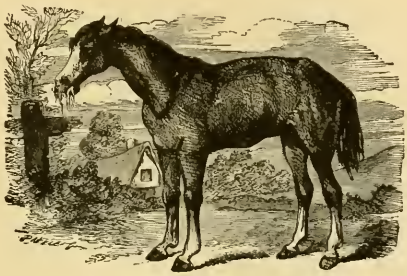
A horse trying to raise the food stuck in the throat from a stricture in the gullet.

What to do.—Give the horse a couple of swallows of raw linseed oil, and manipulate the lump, and try and pass it on a little at a time, till it is all worked down; if this proves ineffectual, the probang must be used, but great care and caution are necessary not to keep it in too long, and not to push it through the walls of the gullet. A horse cannot breathe with the probang in his throat, therefore it is dangerous to leave it in longer than one minute at a time. If the obstruction is near enough to the throat, so it can be reached with the hand, run your arm down and remove it. As a last resort, when all other means have been exhausted, cut down upon the substance and remove it. Make the opening in the skin large enough to get a hand in, but make the hole in the gullet as small as possible, just large enough to get one finger in, and break down the obstruction.

TWO FORMS OF PROBANG.

The probang with a piece of sponge on the end is far the best.

Cut carefully so as not to wound the jugular vein. Draw the edges of the gullet together with either catgut or silk, and dress it twice a day with lotion No. 39. Sew the skin with silk, and after dressing the wound with the above lotion, saturate a wad of oakum with the lotion and tie it over the wound. Keep the horse on very sloppy food, and very little of it,

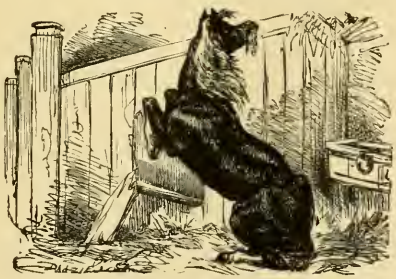


THE LOW CHOKE WITH FLATULENCE.

mostly oatmeal gruel, until the wound in the gullet is healed. Avoid making the opening if possible, for it is very hard indeed at all times, and sometimes utterly impossible, to make it heal, and a fatal termination is often the result.

VII. Gastritis.

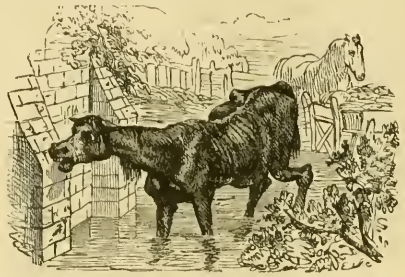
Causes.—This is inflammation of the stomach, caused by over-eating at any one time, getting into a clover field or at an oat bin or corn crib. Eating poisonous herbs or accidentally eating poison also causes it. The



HORSE SUFFERING FROM ACUTE GASTRITIS.

disease has a tendency to leave the stomach and go to the feet and cause founder. On account of this tendency we seldom have occasion to treat gastritis.

How to know it.—There is a tendency to wind colic, the food not being digested rapidly enough, decomposition sets in and leads to flatulence. There is usually a loss of appetite, and sometimes symptoms of nausea, such as turning up the nose.



CHRONIC GASTRITIS.

A horse quenching the excessive thirst of chronic gastritis.

What to do.—Give a complete change of food; if corn and oats have been fed, change to bran, carrots and boiled barley, and if in season, give green food. Give raw linseed oil in half pint doses once a day till the bowels are quite soft, and feed a little oil-cake meal, a pint once a day. If wind accumulates after eating, give the following as a drench:

No. 47. 1 Teaspoonful bicarbonate of soda,
1 Ounce extract of ginger,
½ Pint water,
Mix and give as one dose.

If thirst is excessive, give half an ounce of chlorate in the water, well dissolved, twice a day. This excessive thirst is often seen as a symptom of the disease when it has become chronic.

VIII. Stomach Staggers.

This is a sleepy, dumpish, stupid condition resulting from engorgement, and through the nerves the impression is carried to the brain, and stupor is the effect.

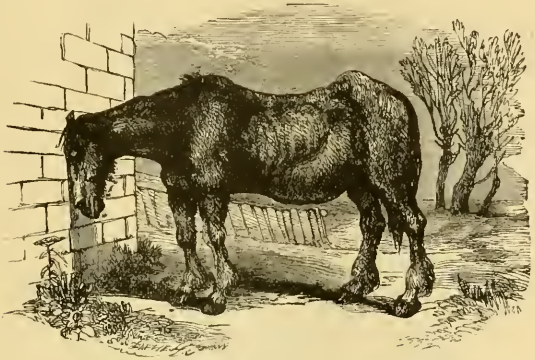
Causes.—It frequently happens after over-eating on clover, or the horse gets into the garden and fills up on cabbages or roots of any kind.

How to know it.—The horse is usually found standing in a stupid manner as though asleep, perfectly quiet, and perhaps with his mouth full of food; he is oblivious to all around; place one foot across the other, and he will leave it so; prick him and he may wake up for an instant, but subsides again as quickly.

What to do.—Put him in a safe place; remove all food; give him very little water, and give a dose of purgative medicine as follows:

No. 48. 6 Drachms barbadoes aloes,
1 Pint raw linseed oil,
Mix.

Give as one dose. As soon as he is sufficiently recovered give him walking exercise. If the purgative does not work in the course of twenty-



A HORSE WITH STOMACH OR SLEEPY STAGGERS.

four hours, give injections of warm water and soft soap every hour till purgation is obtained.

Prevention.—Avoid engorgement; feed on bulky food.

IX. Dyspepsia.

Causes.—This is rather uncommon, but is occasionally seen in horses that have been fed artificially for any great length of time, especially if highly fed.

How to know it.—There will be a general unthrifty appearance to the horse; he will be thin; coat rough and staring, hide bound; and the surest symptom of all is the yellowish color and offensive smell of the manure. After a while the appetite wanes; he gets hungry, and will rush at the food as though he would swallow the whole at once, eats a few mouthfuls and leaves the rest; perhaps he will nibble a little more, but will not eat as though he relished it. He gradually grows worse, till he becomes a mere skeleton.

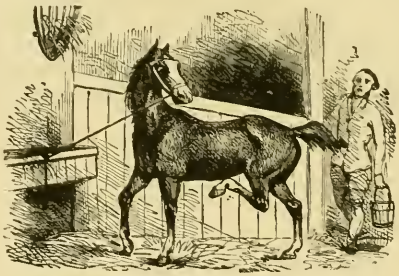
What to do.—If practicable, give him three or four months at grass; first examine the teeth, and remedy any defect. If it is not the right

time of year to turn out to grass, give a complete change of food; carrots, turnips, apples, boiled barley, scalded oats, and bran mashes. Feed no corn at all. Give a dose of purgative medicine, recipe No. 23. When the purgation is all over, give the tonic No. 34, in soft feed. If the appetite is poor, so that he won't eat the powder, give No. 35. Continue it a week, then stop a week, and repeat.

X. Spasmodic Colic.

The term colic, means pain in the colon, (one of the large intestines), but is accepted as the name for all pain in the abdomen. It is often called belly-ache. It is always very serious, indeed, for two reasons—it is terribly painful, and is very apt to run into inflammation of the bowels, which is usually fatal.

Spasmodic colic is pain in the bowels, from the violent, spasmodic contraction and cramp of the muscular coat of the bowels. It is called spasmodic on account of the pain and cramps being spasmodic, and not con-



THE FIRST STAGE OF SPASMODIC COLIC.

tinuous; there are moments of relief from the pain, in which the animal will be quite at his ease, but it is apt to come on again after a few moments.

Some horses are particularly subject to colic, owing to a ravenous manner of eating and drinking, consequently they have it from time to time, and usually die with it after a few repetitions.

Causes.—It is caused by some irritant in the bowel—indigestible matter; also by large draughts of cold water, particularly if the horse is warm. Colicky pains are very often symptoms of other diseases.

How to know it.—In the first stage, the horse will begin to be uneasy; looks around; raises up his hind feet towards his belly; steps around from one side of the stall to the other; stops eating; will curl as if to lie down

In the second stage, he lies down and gets up again after lying, perhaps, a couple of minutes; in the third stage, he rolls, kicks, sweats profusely, has a haggard countenance, is inclined to turn upon his back, and remains so. In mild cases, after kicking for half an hour or so, the

SECOND STAGE OF SPASMODIC COLIC.

horse usually gets better, the pain all passes off, and he returns to his accustomed spirits and habits; but if it does not go off in the course of half an hour, and from that to two or three hours, it is apt to run into enteritis, and kill him.

What to do.—Give mild, diffusible stimulants, as early and quickly as possible. Give either of the following:

No. 49.
2 Ounce whiskey,
1 Ounces extract of ginger,
½ Pint water,
Mix.

Give as one dose. Or this:

No. 50.
1½ Ounce sweet spirits of nitre,
1 Ounce laudanum,
½ Ounce extract of ginger,
½ Pint water,
Mix.

Give as one dose. Always, when possible, give warm water injections with a very little soap in it, just to make it a little slippery. Give the horse a soft, roomy place to roll in, and if he has the colic at all bad, give a couple of days rest afterwards, feeding on soft food. Give the abdomen friction, and put on a blanket to avoid his cooling off too soon.

When the worst part of the pain is over, a little walking exercise will be beneficial. If after giving the first dose the pain continues more than

half an hour, repeat it every half hour till relief is obtained; but if it does not yield with three or four doses, give the following:

No. 51. 1 Quart raw linseed oil,
½ Ounce chloroform,
Mix.

Give as one dose. In half an hour, if the pain is continuous, give

No. 52. 4 Grains sulphate of morphia,
½ Ounce water
Mix.

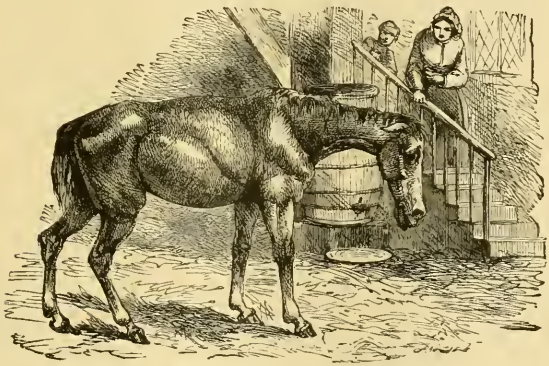
Give as one dose with a syringe. Repeat it every half hour if necessary to keep him quiet. If this does not effect a cure, refer to treatment for enteritis, for it certainly has run into inflammation of the bowels.

THIRD STAGE OF SPASMODIC COLIC.

XI. Flatulent Colic.

Causes.—The nature of this disease is acute indigestion. Either weak digestion, or a suspension of digestion entirely, allows the undigested food to decompose, and while undergoing that process, fermentation sets up, gas is evolved, and the horse bloats up, sometimes to an alarming extent, even to cause death by suffocation or rupture of the stomach, intestines or diaphragm. It is most common where corn is fed freely, and is apt to come on when the horse is taken out to work or drive immediately after eating. The active exercise retards or wholly interrupts digestion, and the moment digestion stops, decomposition sets in and the evolution of gas begins. It is very weakening and often fatal. It usually lasts about two to four hours, but sometimes lingers for ten or twelve, and sometimes proves fatal in half or three-quarters of an hour.

How to know it.—The characteristic symptom is the bloating with gas, and there is always a great amount of pain. The horse rolls, kicks, paws, tries to lie on his back, gets up and down, sweats tremendously, has a haggard look in his face, gulps wind and food from the stomach in small quantities through his nose; and the food thus discharged is usually green and very sour. The nostrils are distended, breathing rapid and breath cold from the shallow breathing; the pulse is quickened at the start, but gradually grows harder and smaller as the fatal termination approaches; the belly becomes so distended that the flanks are above the points of the hips; and in some cases, when lying down, the legs are so spread from the distension of the belly that the animal is unable to get up. If it lasts very long, the nervous system becomes exhausted; the



HORSE DYING OF FLATULENT COLIC.

muscles around the chest, shoulders and neck cramp and draw down so as to almost pull the horse to the ground, and he will sometimes scream out like a child from the pain. The ears and extremities get deathly cold.

If rupture takes place, he will sit on his haunches like a dog, turn up his upper lip as though nauseated and try to vomit; but owing to the peculiar formation of the stomach the horse cannot vomit. The pulse gets weaker and smaller till he falls and dies from nervous exhaustion. When he dies in earlier stages, it is from suffocation: the distension of the stomach and bowels presses on the lungs so hard that it forces them up into so small a compass that they cannot work, and suffocation is the result.

Favorable symptoms are cessation of pain; free evacuation of gas per rectum; pulse returns to its normal condition; ears and extremities regain their natural temperature; sweating stops, and the horse returns to his feed and customary habits.

What to do.—As soon as it is discovered, give the following:

No. 53.
1 Tablespoonful bicarbonate soda (saleratus).
1 Teacupful water,
Mix.

Give as one dose, and repeat it, if necessary, in ten minutes.

Give warm water injections, being careful not to push the nozzle of the syringe through a gut; for the intestines crowd backward so hard that it is very difficult to give injection enough to amount to anything, although it is best to try. If the soda does no good, give the following:

No. 54.
1 Ounce turpentine.
½ Pint raw linseed oil.
1 Ounce laudanum.
Mix.

Give as one dose, and repeat it in fifteen minutes, if necessary. If this proves ineffectual, give

No. 55.
1 Ounce chloroform,
1 Pint raw linseed oil,
Mix.

Give as one dose, and repeat, if necessary, in half an hour.

Bind hot water rags to the belly, and keep them hot.

As a last resort, if the flatulence does not yield to the above treatment, the trocar and cannula may be used. Let it be a small one, not over one quarter inch in diameter and three inches long; find the center of a triangle formed by the last rib, point of the hip, and the edges nearest the flank of the spines in the loins; clip off the hair, and pass the trochar in slowly and firmly, pointing it in and down at the same time, so as to avoid wounding the kidney; leave the cannula in there, but draw out the trocar, and, if the gut that is distended is tapped, the gas will rush out. Sometimes fœcal matter will clog the cannula; if so, pass in a small piece of whalebone, or other probe, to remove it from the lower end. If no gut is tapped, try the same operation on the other side. It makes no difference which side is tapped, for there is no paunch adherent to the side of horses, as in cattle. The treatment by the mouth may be kept up while this is done.

TROCHAR PROVIDED WITH CANNULA FOR PUNCTURING THE ABDOMEN.

When they drop from suffocation, or when rupture takes place, it is too late to do anything; but, in every case, persevere till either one or the other of these tells you further effort is useless.

XII. Rupture of the Stomach, Intestines or Diaphragm.

Causes.—This occurs in violent cases of flatulence. When the generation of gas is excessive in the stomach or the intestines, they are liable to rupture, and let the food out into the abdominal cavity, or from the

UNNATURAL ATTITUDE INDICATIVE OF ABDOMINAL INJURY.

tremendous pressure against the diaphragm, it is liable to rupture and let the intestines into the chest among the lungs and heart. Either case is fatal, the animal dying from shock to the nervous system, hemorrhage and suffocation.

How to know it.—The horse will sit on his haunches; but this is not a characteristic symptom of itself, for we see it occasionally in spasmodic colic, and often in enteritis; the horse will turn up his nose with an intensely disgusted expression on his countenance, but this, too, is often seen in colic and enteritis; he will try to vomit, which is a characteristic symptom, and the muscles and legs will tremble and shake as if with cold; the ears and legs get cold; cold sweat breaks out in patches; the mouth gets cold, the pulse grows smaller and smaller, till it becomes imperceptible, and death claims the patient in the course of half an hour to two hours.

NOSE STRAINED UPWARD.

XIII. Constipation.

When the fœcal matter in the intestines gets dry and hard, and resists the peristaltic effort of the bowels to pass it on, or when there is no peristaltic motion to the bowel, and the food lies quiet in one spot, there is

an obstruction to all intents and purposes, which is called constipation, or costiveness.

Causes.—When the food dries and hardens so that it cannot be passed on, it is due to an insufficient quantity of water in the bowel, owing to its all going to the kidneys, or it is due to the horse not drinking enough, or to inactivity of the liver and other glands that supply the bowels with juices. When it is from a want of peristaltic motion, it is due to nervous weakness in the bowels.

How to know it.—Little or no fœtal matter is passed; what is passed is hard and dry; mild colicky pains are felt at intervals of half an hour or so. The horse may continue to eat and otherwise appear all right, but as it runs on, the pains will come oftener and be more acute till it runs into enteritis.

What to do.—If the pulse is natural and the colicky pains slight and far between, give recipe No. 23; also give warm water and soap injections. If the pains continue and increase, give a quart of raw oil and recipe No. 52. If it does not yield to this, give the following:

No. 56.
1 Quart raw oil.
1 Ounce tincture nux vomica.
Mix.

Give as one dose. Repeat recipe No. 52 often enough to keep down the pain. If the pain seems to be increasing and the constipation obstinate, apply to the belly, well rubbed in, the following:

No. 57.
1 Ounce croton oil,
3 Ounces raw linseed oil.
Mix.

Repeat recipe No. 56 every six hours till a passage is effected. Repeat the injections once an hour, but put in less soap each time. If it is necessary to repeat them more than four or five times, use clear water without soap.

XIV. Diarrhœa and Superpurgation.

These are watery evacuations from the bowels, and are the opposite to constipation.

Causes.—In diarrhœa there is an excessive secretion of the juices of the system, owing usually to some irritant in the bowels, but sometimes to too laxative food. Superpurgation is due to an overdose of purgative medicine.

How to know it.—The evacuations are frequent and watery; after running a while the bowels become irritable and the patient strains a good deal and becomes weak; the pulse gets feeble; the mouth clammy; the ears and extremities cold, the eyes and nose pale; the horse grinds his

teeth, and refuses food: thirst is excessive. The temperature of the body taken with the thermometer is down, perhaps to 95° Fahr. If it goes down to 93°, the disease is almost sure to terminate fatally.

What to do.—If it is a straight case of diarrhœa—that is, without any purgative having been given—give a complete change of food and the following:

No. 58.
1 Ounce prepared chalk,
1 Ounce ginger,
1 Drachm opium,
1 Pint starch gruel,
Mix.

Give as one dose, and repeat it, if necessary, after three or four hours. Give him water with flour stirred in to drink, but restrict the quantity to about two quarts every three or four hours. If this does not stop it after giving two or three doses of the medicine, give the following:

No. 59.
½ Pint raw linseed oil,
1 Drachm opium,
1 Ounce tincture catechu,
Mix.

Give as one dose. If superpurgation is the trouble, give the flour and water to drink. If this does not check it in five or six hours, give in addition:

No. 60.
1 Ounce tincture catechu,
½ Ounce tincture camphor,
1 Ounce tincture opium,
1 Quart starch gruel,
Mix.

Give as one dose. Repeat it if necessary every four hours. Restrict the drinking a little, and feed lightly when the appetite returns.

XV. Dysentery.

The nature of this disease is bloody evacuations with great straining, There is inflammation of the mucous membrane of the large intestines, with more or less fever and great irritability of the intestinal tract.

Causes.—Neglected diarrhœa and superpurgation; too acid a condition of the bowels; impure, indigestible and musty food; and foul atmosphere.

How to know it.—By the bloody evacuations; severe, frequent and ineffectual attempts to pass fœcal matter; colicky pains; considerable fever; great thirst; no appetite; pulse quick, weak and compressible. It is rather rare in the horse; when it does exist, worms are often found, too, and are thought by some to assist in the cause of it.

What to do. Give recipe No. 59, and give injections of starch with one ounce of laudanum in each injection; repeat the latter every half

A HORSE WITH CHRONIC DYSENTERY.

hour. In one hour after taking No. 59 give No. 58, and in another hour, if the straining continues, give No. 60, and the following injection:

No. 61.
1 Ounce tincture of opium,
1 Ounce sulphuric ether,
1 Quart starch,
Mix.

If no improvement takes place in the course of ten hours, give a pint of raw oil and repeat the injection every half hour.

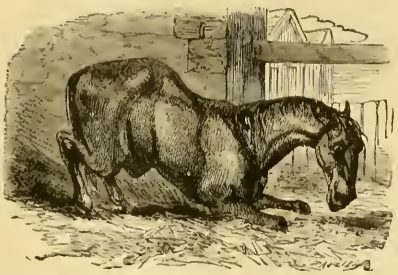
XVI. Enteritis.

Inflammation of the bowels takes two forms, according to the part affected. Enteritis is inflammation of the mucous lining of the bowel; the next subject, peritonitis, is inflammation of the outer or serous covering of the bowel.

Causes.—Irritating substances in the food; catching cold which settles in the bowels, continuation of colic, either spasmodic or flatulent; and poison.

How to know it.—There is continuous pain, light at first, and increasing as the inflammation develops. It is different from colic, for which it might be taken by an ordinary observer, in that it is continuous, while colic is intermittent; in colic, the horse throws himself down; in enteritis he lies down carefully; the pulse is raised to seventy-five or eighty, or even a hundred

beats to the minute ; the countenance wears an anxious look ; he is very uneasy ; when not getting up and down he is turning around ; if in a box stall, he looks around to his sides, paws, raises his legs up towards the body ; the breathing is hurried ; there is profuse sweating ; the pulse is soft at first, but grows gradually harder, faster, and at last it gets wiry, and finally imperceptible ; the extremities get cold, and the horse wears himself out



POSITION ASSUMED BY HORSE SUFFERING FROM ABDOMINAL INJURY.

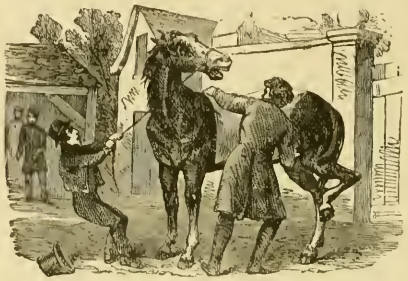
with the pain and constant moving about. Towards the last, the pain will apparently abate a little ; he will stand quiet for a while ; brace his legs till he cannot resist any longer, and will reel and drop, the hind end first, generally. He dies in the course of eight to twenty hours after the first symptom, but in some instances the horse will die in six hours after the very first symptom. Sometimes they get perfectly crazy with the pain, and they will rear, run, climb over anything, tear down the stalls, etc. They can bear no pressure on the belly without pain.

ENTERITIS.

A test for enteritis, the mouth usually being found hot and dry.

What to do.—Treatment is of very little use, for a genuine case of enteritis is always incurable, but it is best to try always. At first, it is usually taken for colic, and the prescribed drenches are given for that disease ; but when you notice the pain is continuous and the pulse runs up, it is sufficient evidence to locate the trouble as inflammation of the lining of the large intestines ; then give No. 56, and apply a mustard paste to the belly. After it has been on an hour, wash it off and repeat it, or apply No. 41, and confine the fumes with a blanket. A few minutes after giving the oil, give No. 52 ; repeat the latter every half hour, if necessary to keep him easy. Give No. 30, continuously, in addition to the others. Also give injections of soap and

water. If the pulse continues to quicken and get hard, repeat the oil every two or three hours, and apply No. 57 to the belly where the mus-



ANOTHER TEST FOR ENTERITIS.

A horse manifesting tenderness upon pressure on the belly in enteritis.

tard was. If the oil works through, there is a chance of success; then just let the horse remain perfectly quiet for several days, give oat-meal gruel to drink.

Post mortem examination shows the bowel affected to be almost black from congestion, inflammation, and mortification. The disease usually

APPLICATION OF AN AMMONIACAL BLISTER.

confines itself to about a yard of the gut. The tissue of the intestine will be swollen sometimes over an inch thick.

XVII. Peritonitis.

This is inflammation of the outer covering of the bowel; it is less rapid in its course, and less painful. It may last a week or so, or it may kill in ten or twelve hours.

Causes.—Wounds in the abdominal cavity, exposure to cold storms, kicks in the belly, etc.

How to know it.—The pulse is quick—from sixty to seventy-five, and is hard and wiry; the horse lies down very easy, but gets up quick; loss of appetite. When the inflammation does not kill, effusion of water takes place into the belly, giving the horse the appearance of dropsy by the large abdomen. There is great pain upon pressure on the abdomen.

Post mortem examination reveals extensive discoloration of the bowels and surrounding tissue. A great quantity of bloody matter is floating in the cavity. The inflamed portion of the intestines is very much swollen.

What to do.—Give No. 56 as soon as the nature of the disease is recognized. Give No. 52 occasionally to allay the pain, and apply No. 57 to the belly. Give No. 30. continuously for several doses, till the pulse is improved. In case the abdomen fills with water, it may be tapped by passing in the trocar and cannula—the smallest size—through the centre of the belly, and through the hard, fibrous band running down the center. It is called *paracentesis abdomenis*, and should be performed by experts only.

XVIII. Calculi.

Intestinal calculi are not very common, although they are occasionally met with. It is very probable, that if all the cases of death from bowel troubles were examined *post mortem*, calculi would be quite often found, as that is the only way their presence can be determined.

Causes.—These stones are formed of calcareous material laid on in layers, and are usually found enveloping a nucleus of some kind—a piece of a nail, or a pebble, or a wad of hair, etc. They sometimes attain to enormous sizes and weight, and are usually round or oval. These stones are most common in sections of the country where hard well water is used for drinking, especially in lime districts.

Dust balls are common in horses that are fed on mill-sweepings; the dust accumulates around oat hulls or chaff from other grain. As many as a dozen have been found in one horse after death.

Calculi are seldom or never passed in a natural way, but make sacks in the bowel, and lie there till by accident they are dislodged and roll out into the passage, and form an obstruction, cause a stoppage, inflammation and death.

How to know it.—In addition to the symptoms of enteritis, the patient will frequently sit on his haunches like a dog. This is not a characteristic symptom, but in cases where calculi have been found, it was a prominent symptom.

What to do.—Nothing more can be done than to treat the symptoms, which are those of enteritis. Back raking is advisable, but it is not

among the probabilities that the stones would be near enough to the rectum, to be reached by the hand.

XIX. Intussusception and Gut Tie.

This is the slipping of a part of a gut into another part, like turning a finger of a glove partly wrong side out. It is rather uncommon. A case was lately seen by the writer, in which the blind end of the *cæcum* was turned into the other part, the fold coming at the intersection of the small intestines.

Causes.—The cause of intussusception is purely accidental.

How to know it.—There are signs of bowel trouble; colicky pains that come on gradually; the horse looks around; paws; stretches at full length, which is a tolerably characteristic symptom; gets up and down; the pulse rises and has a tendency to become hard and wiry; legs and ears get cold; patches of cold sweat break out over the body; the pulse gets smaller and harder; the muscles tremble, and death soon follows, which is caused by strangulation of the gut and mortification of the part affected.

Post mortem examination shows great swelling of the gut, sometimes to an inch thick, and the mortified portion will be black.

What to do.—As soon as any rise or change in the pulse is detected, especially if there is stretching and colicky pains, give recipe No. 56, hot water injections, and hot water rugs to the belly. If this does not give relief in an hour, give No. 55, and repeat it every two hours till relief is got; in between these doses, if necessary to keep down the pain, give No. 52. In some cases the intestines will return to their proper place, and their functions go on naturally again, but in some cases all efforts are unavailing, and death takes place in from ten to thirty hours.

Gut Tie.—This is similar in effect; the bowel gets into a half knot and strangulation follows the same as in intussusception.

Gut Twist.—This is a twisting of a gut by turning partly over. If it does not right itself, strangulation and death are the inevitable result.

CHAPTER XI.

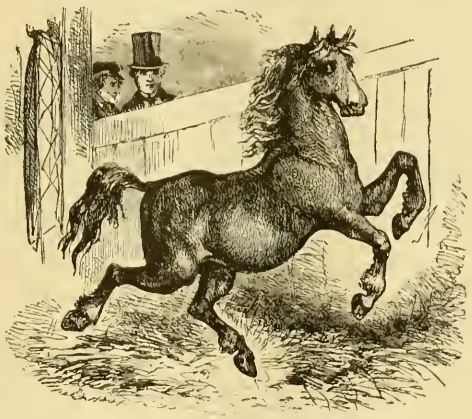
DISEASES OF THE BRAIN AND NERVOUS SYSTEM.

I. PHRENITIS OR INFLAMMATION OF THE BRAIN.——II. CEREBRO-SPINAL MENINGITIS.——III. APOPLEXY.——IV. MEGRIMS.——V. TETANUS OR LOCKJAW.——VI. PARALYSIS. VII.——SUNSTROKE.

I. Phrenitis or Inflammation of the Brain.

All the highly developed nervous systems—those of man, the dog and the horse—are more subject to disease than the quieter, and less developed nervous organizations of the ox, sheep, pig, etc.

Inflammation of the brain, sunstroke, tetanus and paralysis are quite common in the first mentioned animals and very rarely met with in the last.



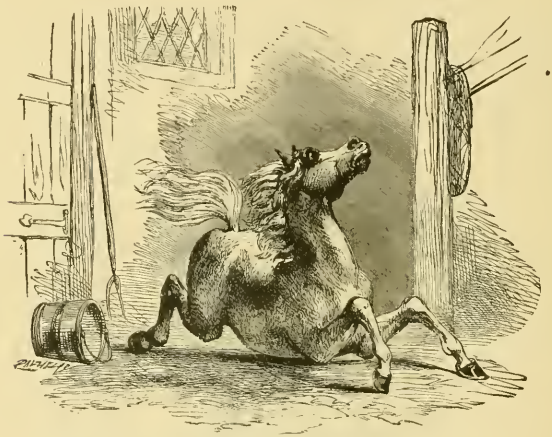
INFLAMMATION OF THE BRAIN.

Sample of the antics of a horse during the delirium of brain fever.

Causes.—The causes of phrenitis are various, such as concussion of the brain; exposure to cold, wet storms; extension of fever from the body; and sometimes the cause is not apparent.

How to know it.—There is a quick pulse; great prostration; respirations are quick, bowels constipated; visible mucous membranes are very

red; delirium at first, but soon runs into stupidity; the horse places his head against the wall and pushes and braces himself against it, and always bruises his eyes and head badly; he will eat occasionally, and will doze off into a fit of stupor with his mouth full and let the food drop; when roused he will paw and move around, hang his head against the wall and then doze off again. These symtoms may continue for several days, the mad fits coming oftener and more violently each time till death takes place, or he may die in forty-eight hours. Animals thus affected sometimes recover, but not very often, and when they do they are not safe; they are liable to another attack at any time, from the most trivial cause;



A HORSE MAD FROM INFLAMMATION OF THE BRAIN.

fits may come on while in the street, the disease assuming almost a chronic character. Young horses are more liable to phrenitis than old ones.

What to do.—If discovered in the very earliest stage when the pulse is very full and quick, bleed the horse, taking from two to four quarts of blood. Give a purgative—recipe No. 48, and apply ice to the head and keep it on continuously. Give No. 30 as a sedative. If the fever entirely subsides and consciousness returns, blister all over the upper part of the head with No. 9. It is necessary to secure the animal well, for he struggles violently during the mad spells.

II. Cerebro-Spinal Meningitis.

This is not a common disease among horses in the cities, and is rarely or never seen in the country. It has existed as an epizootic in New York and Boston.

Causes.—Impurities in the air, the horse being kept in a small or overcrowded, ill ventilated stable, fed very high and not worked very hard. It is induced by a plethoric condition.

How to know it.—The horse seems listless for a day or two, stumbles, reels behind, and sometimes will fall quite down; the pupils become dilated; the pulse gets quick and full; respirations rapid; there is twitching of the muscles of the head and neck; at first he is sensitive to noises, but as the fever increases and the disease developes, blindness and deafness set in, and death soon follows.

What to do.—Put the horse in slings, if possible, before he gets so bad that he cannot stand, and apply ice and bran poultices to the whole length of the spine; give the purgative No. 48, and the following recipe in one-ounce doses three times a day:

No. 62. 8 Ounces bromide of potash,
1 Pint water,
Mix.

Effusion takes place on the brain and paralysis results. When the effusion reaches the centers that supply nerve power to the lungs and heart the animal dies.

III. Apoplexy.

Causes.—Apoplexy results from a sudden pressure on the brain when the horse is otherwise healthy; it is usually due to over exertion in a tight collar, causing a rushing of blood to the head.

How to know it.—There is insensibility, the horse staggers and falls; froths at the mouth; the muscles twitch; there is partial paralysis for the time being; respiration is suspended for a short time.

What to do.—Remove the harness as quickly as possible; give a free chance to breathe; and dash cold water over the head. He will soon recover and go on again all right.

Prevention.—Do not allow the horse to get too fat; see that the collar is not too short for him; it may press hard on each side of the neck to advantage, but it must have good length, at least two inches at the bottom below the neck; avoid fast driving when the horse is not in a condition to stand it.

IV. Megrims.

This is similar to apoplexy, but is a milder form of the disease.

Causes.—It is due to the same causes as apoplexy, but the animal recovers more quickly.

EXPRESSION CHARACTERISTIC OF MEGRIMS.

How to know it.—The horse stops, throws up his head, shivers all over, staggers; the eyes close for a minute; he braces his legs so as not to fall; stands so for a few minutes like a drunken man, shakes himself and goes on as if nothing had happened.

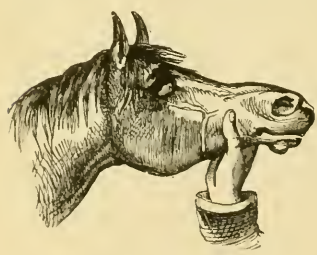
What to do.—See that the harness does not press too tight where it ought not to; if cold water is handy, throw a little over his head; if not, just let him stand and he will soon recover. It is a pet hobby with some to bleed the horse, to stick a knife through the partition in the nose, or into the second or third ridge in the roof of the mouth, but it is entirely useless and somewhat dangerous from overbleeding; it is often very difficult to stop the bleeding from these small stabs.

V. Tetanus or Lock-Jaw.

This is an excessively irritable condition of the whole nervous system—the sympathetic, motor and sensory systems alike; all parts are in a cramp. It is divided into two kinds, *idiopathic* and *traumatic*.

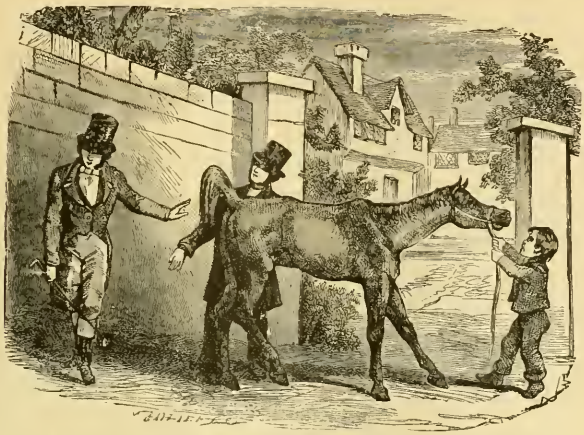
Causes.—The *idiopathic* is a milder form, caused by worms, or by over heating; and it sometimes follows a common cold. The *traumatic* is the result of a wound of almost any kind; sometimes a very slight wound is followed by lockjaw, but the most common cause is nail wounds. Pricks from nails, picked up while the horse is at work, are very often followed by tetanus.

How to know it.—The first thing noticed will be the haw of the eye drawn over the eye ball, showing more of the haw and less of the eye; the nose is protruded; the neck straightened; the tail elevated and trembling; the legs straddle and are as stiff as saw-horse legs; the belly is tucked up; the nostrils dilated; the ears are as stiff as sticks; the respirations are hurried; the muscles are as hard as board; he sweats profusely; and the most serious point of all is the jaws are locked. If the disease is discovered at the start, the jaws will be found not to be locked, but very stiff and opened with



THE TEST FOR TETANUS.

difficulty; but they usually lock tight in the course of twelve hours. If the head is raised, the haw is drawn completely over the eye; the tail is more elevated; he trembles all over, and, if the head is pushed a little farther up, he is liable to fall. He never lies down; cannot eat; drinks with very great difficulty, and is in the most intense agony all the time. Death usually follows in from three days to three weeks.



SHOWING HOW FAR AN ANIMAL WITH TETANUS IS CAPABLE OF MOTION.

What to do.—If it comes from a wound, and all the symptoms are fully developed, there is no use doing anything but to destroy the animal, and thus save a great amount of suffering; but if it is a mild case, give him a chance. Give the purgative No. 48. Put him in a quiet, dark, loose box; allow no visitors: keep him as quiet as possible: put oat-meal water in his manger, and also a pail of clear water. Clothe him warmly, apply a linseed poultice to the wound, wherever it is, first smearing it with Solid Extract of Belladonna. Change the poultice once a day, and smear on the belladonna each time. Give internally the following:

No. 63.

2 Ounces fluid extract of belladonna.
2 Ounces prussic acid, diluted.
Water to make eight ounces.
Mix.

Give a tablespoonful three times a day with a syringe.

If it is an *idiopathic* case, give the same treatment as above; put him in a cool place, and get the purgative down if possible. Let the same

man tend him all the time, and allow no spectators, no loud talk, etc.; let everything be as quiet as possible, and he will usually recover in the course of five or six weeks. Never bleed nor blister for lock-jaw, for the bleeding only weakens and the blistering only irritates the nerves all the more. Some practitioners put the horse in slings, but it is of no use whatever; a case that might require them would be fatal any way, and the excitement attending the operation would only hasten the end.

VI. Paralysis.

This is just the reverse of tetanus; the nervous system loses its power, and the part affected becomes helpless. It usually attacks the hind parts, but sometimes one side, and sometimes the neck and face.

Causes.—Injuries to the back are common causes, in which case there is paralysis of all parts back of the injury. It usually accompanies *azoturia*, cerebro-spinal meningitis, lead poisoning, sun-stroke, etc. When half the body, face, or neck is paralyzed, the cause lies in the constitution, and is not apparent; or it may come from abscess in the brain.

ABSCESS IN THE BRAIN.

A common cause of partial paralysis.

How to know it.—The horse lies in a helpless condition; he can raise himself forward, but is utterly powerless behind. Prick him with a pin, anywhere back of the injury, and no sensation is produced. If it is paralysis of one side, that side is partially helpless; he drags the legs. If it is in the neck and face, the part will be twisted off towards the well side, and the diseased part without sensation.

What to do.—If the horse can stand at all, put him in slings; if not, let him lie down as comfortably as possible. Turn him twice a day, to prevent scalding. Clip off the hair close, and blister well with recipe No. 9, along the spine, from the seat of the injury back to the croup. If

it is paralysis of the face and neck, apply the blister to the base of the brain, over the poll. Rub the surface well with liniment No. 14. Give internally the following powders:

No. 64. 1 Drachm powdered nux vomica.,
2 Drachms powdered gentian root,
½ Ounce linseed meal.
Mix.

Give as one dose; repeat it once a day for two or three weeks; then let him wait a fortnight, and repeat it. When convalescent, give gentle exercise. Abscess in the brain is almost always fatal.

UNSTEADY GAIT OF A HORSE WITH PARTIAL PARALYSIS.

VII. Sun-Stroke.

This is common in some parts of the country, especially in large cities. It is a liquefaction of the fats of the body. All the functions of the body are interfered with or almost stopped.

Causes.—Exposure to the hot sun, or over exertion in hot weather, even if the sun is not shining. Some animals are more subject to it than others, probably depending upon the condition of the system at the time.

How to know it.—The horse may be sweating and suffering with the heat, when suddenly he will stop sweating and dry off; will begin to stagger; get dumpish, deaf, weak and stupid; there will be labored breathing and he will soon drop in the road in an unconscious condition;

the breathing will become more and more labored till death takes place, which will be in from half an hour to two or three hours if no relief is given. The surface of the body will be found to be very hot to the touch of the hand.

What to do.—When the horse begins to suffer and labor with the heat, let him stop in the shade; give a few swallows of cold water to drink, and also sponge off the head and face with cold water. After half an hour he will be able to go on. If he has been compelled to go till he drops, or even till he is in a staggering condition, throw cold water all over him; or if it is in a city where a hose can be used, keep it playing on him from head to tail continuously till he is cooled off; then leave him in a cool place, but not in a draft; let him rest till next day. If it is in the country throw cold water over him by the bucketful till he recovers. If he goes down, use ice on the back if possible. As soon as he is sufficiently recovered to be able to swallow safely, give the following drench:

No. 65.

2 Ounces whiskey.
½ Ounce sweet spirits of nitre,
1 Drachm nitrate of potash,
½ Teacupful water,
Mix.

Give as one dose, and repeat it every half hour till he is pretty well recovered; then drop off to every four or six hours. Leave him in the stable at least a week, and be very careful of him for a long time. During recovery feed on soft food—grass if it can be got. If it leaves him weak and staggering in his gait, clip off the hair from the back and blister with recipe No. 9.

CHAPTER XII.

DISEASES OF THE HEART AND BLOOD VESSELS.

I. INFLAMMATION OF THE ENDOCARDIUM.——II. ENLARGEMENT OF THE HEART.——III. ATROPHY OF THE HEART.——IV. INDURATION OF THE HEART.——V. FATTY DEGENERATION OF THE HEART.——VI. OBESITY OF THE HEART.——VII. CYANOSIS OR BLUE DISEASE.——VIII. RUPTURE OF THE HEART.——IX. RUPTURE OF A BLOOD VESSEL.——X. ANEURISM.——XI. PHLEBITIS OR INFLAMMATION OF A VEIN.——XII. THUMPS.

Diseases of the heart are numerous but difficult to diagnose, except by their effects. Few of them are influenced by treatment; therefore this short chapter on the subject, is given more as a matter of general information than of practical utility.

I. Inflammation of the Endocardium.

This is inflammation of the sac surrounding the heart. This sac is a serous one, similar to the *pleura*, and secretes a fluid to moisten and lubricate the heart in its perpetual motion.

How to know it.—The horse will attract notice as not being in his usual healthy form; his head will hang down; the countenance will express pain; he will stand still with no inclination to move; the pulse will be raised considerably. Upon application of the ear to his side over the region of the heart, a harsh rasping sound will be heard indicating the dry stage of inflammation.

What to do.—All that can be done to advantage is to treat the horse constitutionally by giving recipe No. 40. Feed on soft food for a few days; keep him warm and apply No. 41 to the side over the heart.

II. Enlargement of the Heart.

This is not uncommon; the heart sometimes increases to twice its natural size. This is especially so of the left ventricle; its walls sometimes get unusually thick.

How to know it.—It cannot be definitely recognized during life, but a fair opinion can be based upon the pulse, which will be irregular in its action, both as to force and number of beats. The temperature of the body will be uneven; one side may be cold, and the other warm, one leg cold and the others warm, etc.

What to do.—Give the following recipe:

No. 66.
1 Drachm iodide of potash.
1 Drachm powdered nux vomica.
1 Drachm powdered fœnugreek seed.
Mix.

Give as one dose in a bran mash, and repeat it morning and night, for three or four weeks. Feed on soft food, and give gentle exercise.

III. Atrophy of the Heart.

This is a shrinking and wasting away of the substance of the heart. The walls become soft and flabby, and fail to perform the work in a healthy manner.

How to know it.—The pulse will be weak and irregular—often missing two or three beats at a time. There will be emaciation, languor, pallor of the visible mucous membranes. Death is liable to occur suddenly, at any time, from complete interruption of the circulation by *ante-mortem* clots, that is, clots that form in the heart and blood vessels before death.

What to do.—Give the following powder night and morning, in soft feed.

No. 67.
1 Drachm nux vomica,
1 Drachm sulphate of iron,
1 Drachm fœnugreek seed,
Mix.

Give this at one dose, and repeat it morning and night for three or four weeks. Give gentle exercise, and feed some oil-cake meal every day if he will eat it. Feed well.

IV. Induration of the Heart.

This is a hardening of the substance of the heart, which sometimes becomes almost as hard as wood. There are no characteristic symptoms other than the weak, irregular pulse, and sudden death at some unexpected time. Nothing can be done.

V. Fatty Degeneration of the Heart.

The fleshy substance of the heart degenerates into a kind of fatty substance that is not strong, and may be easily pulled to pieces by the hand after death. There are no symptoms to recognize it by except the weak, irregular pulse. Death is apt to occur suddenly, from *ante-mortem* clot.

VI. Obesity of the Heart.

This is an accumulation of fat around the heart, which interferes with its action, giving rise to a quick, fluttering pulse as though the heart were laboring under a load that muffled it. It makes the breathing short, and

the animal will pant after the least exercise. Nothing can be done. Death is liable to occur from suffocation when the horse is put at hard work.

VII. Cyanosis, or Blue Disease.

This is very uncommon in the horse. The circulation peculiar to fœtal life does not change at birth, as it ought to, by the closing of a temporary opening between the right and left sides of the heart. The failure of this opening to close at birth allows the venus blood to pass right through into the arteries without going through the lungs to be aerated, and gives a blue color to all parts that ought to be pink—the eye-lids, mouth, etc. The animal does not live long, but dies in the course of a week or two. The surface of the body never gets warm; the respirations are usually slow, and there is great weakness, which increases as death approaches.

VIII. Rupture of the Heart.

Horses are liable to rupture the heart at the time of any sudden exertion or jerk. Those with heaves are the most often affected. The right ventricle and the auricles are most liable to it; the left ventricle has walls so thick that rupture of them rarely takes place. Nothing can be done for it. Instant death is the result.

IX. Rupture of a Blood Vessel.

This is a more common accident than any other pertaining to the heart and blood vessels. Any very severe exertion, such as racing, trotting, jumping, extra hard pulling etc., is often interrupted and brought to a stand-still by the rupture of a blood vessel. Those most liable to rupture are the arteries and veins in the abdominal region of the body; the next those in the chest, head, etc. There is no way of foreseeing its approach nor of obviating its effects, which are always fatal from internal hemorrhage. Having the horse in as fine condition physically as possible for any extra exertion is the only way of diminishing the liability to its occurence.

X. Aneurism.

Arteries are liable to get weak in their walls (a tendency to rupture), and dilatation is the result, owing to the immense pressure of the blood from the action of the heart. The large arteries in the abdominal cavity near the back are most often affected in this way.

How to know it.—If it is suspected, examine the parts internally by the hand inserted in the rectum; a large bulge or elliptical enlargement and distinct pulsations are felt when aneurism exists. The swelling is soft and compressible.

What to do.—Nothing can be done for it in that position; if it occurs on the outside of the body, apply cold water and ice, and a compress to the enlargement.

XI. Phlebitis, or Inflammation of a Vein.

This is far less common now than it was a few years ago, owing to the practice of bleeding being done away with; for it was a common result of bleeding, either from using a rusty fleam, or from the horse catching cold in the wound afterwards, or from improper care, the horse not being kept clean. It may result from any wound.

How to know it.—The vein swells and gets hot, sore, red and painful; the inflammation spreads to surrounding parts, and considerable tumefaction is the result. The effect of this condition of things is quite often obliteration of the vein; it becomes hard, filled up, and ceases to act as a vein. The result is not so serious as might be supposed, except when the jugular vein is the one affected; then the horse cannot graze, owing to the blood that is forced to remain in the vessels of the head and neck, causing congestion of those parts, they being in a pendent position.

What to do.—Foment the part affected with hot water three times a day, and manipulate the vein and get the obstruction to move on if possible

XII. Thumps.

This is an excited, spasmodic action of the heart, due to over-exertion —it may be from pulling in heavy draft, leaping or driving. It is most likely to occur in very hot weather.

How to know it.—The horse appears to be in distress, and is pressed for breath; the heart thumps away as if it wanted to make a hole and get out; it often shakes the whole body; the countenance has an anxious expression, and the horse usually sweats profusely.

What to do.—Give something to revive the nervous system, and stimulate the heart to a healthier action. Give recipe No. 65. Rub him down well, put on a blanket if the weather is cold, and give a bran mash to eat. Let him rest for a day or two, and the nervous system will regain its strength, and the horse be as useful as before.

CHAPTER XIII.

GENERAL DISEASES OF THE BLOOD.

I. INFLUENZA—EPIZOOTY—"PINK EYE."——II. PURPURA HEMORRHAGICA.——III. RHEUMATISM.——IV. ABSCESSES.——V. ERYSIPELAS.

I. Influenza—Epizooty—"Pink Eye."

Influenza is the name given to a blood disease in horses that is peculiar in many ways. It is known as the *Epizoöty* and "Pink Eye." It is a blood disease, in that it is caused by the introduction into the system of a poison that has its origin in the atmosphere, and cannot be isolated; it is supposed to be of a malarious nature due to influences very extended in character.

The great epizoöty of 1872 extended over the most of Europe and the whole of North America. It spread from East to West, moving slowly, attacking all animals of the equine race, and lasting from one to three weeks in each locality. It proved fatal to a great many horses; it laid all horses up for a few days at least, so that in all large cities the streets were clear of horses for about a week. It left a great many horses with chronic cough and debilitated systems from which they never recovered, so that they were left in a condition that invited diseases of all kinds, many of which proved fatal, coming as they did in fall and winter.

The "Pink Eye" of this year, 1881, has been less general in its attack, and milder in its character in some respects, but more severe in others. It was more severe in the latitudes including the cities of New York, St. Louis, Detroit, Chicago, etc. It was very mild both north and south of the above mentioned latitudes. It was fatal in many cases, but mostly either from want of care or improper treatment.

It was called "Pink Eye" from the redness of the eyes, which was a prominent symptom in all cases. It was of a complicated nature, there being catarrh of the mucous membranes, both of the respiratory and alimentary tracts; typhoid fever; acute rheumatism; and, in some cases, inflammation of the lungs, bowels and brain; and occasionally tetanus.

How to know it.—The first symptom noticed will be languor; dullness in harness; weakness; sweating easily; and, in very many cases, actual staggering from weakness and nervous prostration in the course of ten hours after being first taken. The horse hangs his head; the ears

droop; the appetite fails; the eyes become very red; the pulse very quick, frequently as high as seventy to eighty per minute, full at first but gradually getting weak; the respirations are rapid; the eyelids swell sometimes so as to close entirely; the temperature taken by the thermometer will show as high as 105° to 107° F. All these symptoms will appear in the course of twelve hours. In the next twelve hours there will be colicky pains, and constipation; the stools will be rather hard and dry and covered with slime, indicating a feverish lining to the bowels; the legs swell tremendously and get very sore to the touch, especially around the fetlock joints and along the back tendons; the mouth is very hot, and sometimes dry; the eyes run tears profusely, which flow down over the face; the surface of the body in most cases is very hot to the touch; the urine is scanty and high-colored; the thirst great; in some cases there is swelling of the throat and a cough; the nose runs a watery discharge. During the second and third days the eyes discharge matter which runs down the cheek, scalding off the hair; the discharge from the nose becomes purulent and sticks around the nostrils; the legs get sorer; the bowels loose; sometimes diarrhœa sets in and carries the animal off suddenly; sometimes constipation appears which usually runs into inflammation of the bowels and kills; the lungs are liable to take on an inflammatory condition and run into pneumonia, often causing death; and the fever often goes to the brain and causes phrenitis which is usually fatal. Horses with influenza lie down a great deal at first, but if the lungs become affected, they persistently stand, and they lose flesh most unaccountably fast—it goes off as though it were whittled off, leaving a fat hearty animal as thin as a skeleton in a week.

They may refuse to eat; and the fever may continue to increase, and weakness become so great as to prove fatal without any other complication.

The favorable symptoms are return of the appetite; diminishing of the swellings around the eyes and legs; ability to lie down comfortably; bowels and kidneys regular; and a brightening of the countenance

What to do.—When the first symptoms are noticed, lay the horse up at once; see that the stable is clean, dry and well-aired, but no drafts; put on blankets, and bandages to the legs; give soft feed to eat, if they will take it, and anything they may fancy, if the appetite is poor; a little corn, oats, carrots, apples, etc.; but the best food is oats and bran in equal parts, wet up and steamed with boiling water; all the treatment must be given with a view to sustaining the strength. For medicine, at the outset, give No. 40, in two-ounce doses, every two hours, till the fever is checked; continue it night and day till the thermometer comes down to 103°; then hold up on it a little, and give it only three times a

day, and when the temperature comes down to 100, change to No. 18—three times a day—for a couple of days; then, if everything is progressing favorably, give No. 35 three times a day, or No. 34 in the feed twice a day. If the throat swells, and there is a cough, rub the throat with No. 41. If the fever goes on to the lungs and causes bronchitis or pneumonia, apply No. 41 to the sides and chest, and give the other recipes as directed above. Set a pail of water in the manger, so he can

A HORSE WITH INFLUENZA.

drink a swallow or two often to cool his mouth and throat. Give plenty of bedding, and make him as comfortable as possible. The bowel trouble you need not give anything for, unless the colicky pains hang on for several hours, then give a few doses of a pint of raw linseed oil, at intervals of six or eight hours. Between times, if necessary to control the pain, give No. 52. If there is long-continued weakness, give No. 64 alternately with No. 35. During convalescence, give gentle exercise.

II. Purpura Hemorrhagica.

This is a disease in which the watery parts of the blood ooze through the coats of the blood vessels, and settle down into the tissues of the most dependent parts, causing them to swell to enormous size.

Causes.—It results from an impoverished condition of the blood, in which the fibrine is deficient, allowing the watery portion to pass through the pores of the coats of the blood vessels and gravitate to the limbs, belly, chest, and nose. This impoverished condition of the system is due either to some debilitating disease or to starvation—usually the former.

How to know it.—The limbs swell enormously, so much so that the animal can scarcely move. The swelling begins in the lower part of the legs, and keeps coming higher from hour to hour, there being an abrupt termination of the swelling at the top. It continues to rise till it reaches the body: then extends along the belly, the full width of it, and as thick as a small mattress.

Yellowish, watery fluid will ooze through the skin and trickle down the legs. The same from the belly, but to less extent. The muzzle begins to swell the same as the legs, and the swelling extends up towards the eyes, often completely closing them; when it reaches the brain it causes death. The secretions are usually at a stand-still, especially the urine, none being secreted; the water, when it accumulates around the internal organs, causes death. The visible mucous membranes will be found to be covered with purple patches, varying in size from a dime to a fifty cent piece. The pulse is small, weak and wiry. The discharges on the legs and belly have an offensive odor, and the breath is also offensive. Great debility is a prominent symptom; the horse is unable to eat or drink. The disease is generally fatal, either by the causes mentioned above, or by suffocation from the swelling of the nose, or by gangrene of the internal organs. Usually before dying, the animal presents a most horrible sight, so as to look like almost anything else than a horse.

PURPURA.
Appearance of horse's head with purpura.

What to do.—Begin early to give the following recipe:

No. 68.
1 Ounce tincture muriate of iron,
1 Ounce tincture of gentian,
2 Ounces water
Mix.

Give a tablespoonful every two hours with a syringe, so as to get it back into the throat with as little trouble and worry to the patient as possible. Alternate with No. 68, the following:

No. 69.
1 Ounce turpentine,
3 Ounces linseed oil.
Mix.

Give a tablespoonful every two hours. Alternating these two recipes will fetch doses only one hour apart; continue these as persistently as possible, till he is either better or dead. Give oatmeal gruel to drink, and give anything to eat he can masticate. If he cannot eat nor drink, give oatmeal gruel injections. Foment the head, if swollen, with hot water as persistently as possible, with the view of driving the swelling to other parts.

The favorable symptoms will be a diminution of the swellings, return of the secretions and appetite, improvement of the pulse, and disappearance of the purple (echymosed) spots.

III. Rheumatism.

Causes.—This is supposed to be an accumulation, in the blood, of a peculiar acid that settles around joints, along tendons and sometimes

in muscles. Upon the slightest provocation in the way of exposure or derangements of the stomach and bowels, it is apt to assume the acute form, and to cause intense pain and lameness.

How to know it.—There is lameness, usually of a peculiar kind, flying from one joint to another, and from one leg to another; sometimes the parts swell and sometimes not; the joints most commonly affected are the fetlocks, knees, shoulders and hips. There is usually more or less fever, high pulse, and sometimes suppuration of the affected parts.

What to do.—Give recipe No. 36. Foment the affected parts with hot water three times a day, and apply as a liniment, recipe No. 15, after wiping down the legs quite dry, and bandage warmly with flannel. After the most acute symptoms are gone, give walking exercise.

IV. Abscesses.

An abscess is a gathering of pus in a sac from a morbid process in the tissues. It may develop in any part of the body. The most common locations of them are on the ribs, on the belly, in the groin, in the *levator humeri* muscles, etc. They sometimes attain to tremendous proportions; they are not painful as a rule, but if they come in or near a nerve center there is great pain; when they form in the groin, for instance, there is very great pain; while on the ribs they cause little or no pain.

Causes.—Impurities in the blood from retention in the system of effete matter that should be eliminated through the excretory organs—the bowels, kidneys and skin. The exciting causes are sometimes bruises from blows, kicks or other injury; but these bruises are not sufficient in themselves to cause an abscess, but must be accompanied by the morbid condition of the blood; then the injury may simply afford an excuse for its breaking out in that particular place.

How to know it.—There is always a great amount of swelling, hard at first all over; but as it grows and approaches a full development it gets soft in the center, pitty in a ring around the center, and hard on the outside. It is hot, red, and sore to the touch. It takes from one to six weeks to mature an abscess so it will break of itself, according to its location and depth. Those in the groin take three or four weeks to mature; those on the ribs and belly mature in the shortest time above mentioned; and those in the *levator humeri* muscles (found just inside and in front of the joints of the shoulders) take the longest time to mature. In fact, the latter sometimes acts like a tumor by its slow growth, hardness and length of time it takes to break out without outside assistance.

When opened, the pus runs out, and the abscess usually heals readily; but sometimes the healing process requires a great deal of assistance, and the abscess is liable to start anew and develop others as soon as one is healed, unless the cause is removed by purifying the blood.

What to do.—Give a purgative of recipe No. 23, and when it has stopped purging, give No. 31 for a week or so. Poultice the abscess with any hot, soft poultice—linseed meal is the best—till it points, (comes to a head), in a soft spot; then tap it with a pointed knife, and evacuate the sac; make the opening big enough to allow a finger to be passed in; see that all is clear for a thorough emptying; then inject warm water to wash it out, and inject No. 5. Repeat this twice a day. Make the opening at the bottom, if possible, to allow the pus to gravitate out, instead of having to be squeezed out. The abscess in the *levator humeri* muscle is always deep-seated in the muscle, and requires a great length of time to rot out. It is easily recognized by its position, being inside and a little to the front of the point of the shoulder. It is useless to wait for it to come to a head; open it at once. Take a long-bladed scalpel or pocket knife and run it in directly into the center of the tumor, letting the knife be parallel with the horse's body; then there is no danger of tapping the jugular vein. It is necessary, usually, to cut about four inches deep before reaching the pus, but when once emptied it heals very readily.

V. Erysipelas.

This is inflammation of the skin. It may be superficial and only involve the upper layers of the skin, or it may be deeper-seated and involve the under layers. The superficial does not suppurate, but the deep-seated usually does, with more or less sloughing. It is often thought to be contagious, which it undoubtedly is to a small degree; but not sufficiently so to be ranked as a specific blood poison. It sometimes rages as an enzoötic—common in any certain district. It usually follows wounds, injuries and sores, but sometimes comes on apparently healthy skin.

Causes.—It is due sometimes to the weather, when it is damp, hot and oppressive, with thunder frequent and low barometeric pressure, especially if the horse is kept in low, filthy places. Poorly fed, thin, neglected animals are most subject to it. The sudden suppression of a chronic discharge, and feeding on rich, heating food when the animal has been accustomed to poor, scanty food, and keeping animals with open sores near decomposing animal tissue are also cause of erysipelas. The common means of contagion are washing erysipelatous and healthy wounds with the same sponge, using the same harness, clothing, etc.

How to know it.—There is usually some fever; the pulse and temperature are raised; the urine is scanty and high-colored; the bowels usually constipated; there is loss of spirit and appetite. These symptoms are followed, in the course of twelve hours, by a diffuse swelling that is hot,

red, and painful; if it is on a white skin it will be found to be shining, tense and of a deep red. It spreads rapidly, terminating abruptly at the edges in a well defined line of demarkation. The swelling does not pit on pressure; the redness disappears on pressure, but returns when the finger is removed. It is confined to the head and legs. It has a peculiar smell, like that of burnt hair.

Sometimes it extends to the cellular tissue under the skin when it is known as *phlegmonous*; this always suppurates, and has a purple appearance previous to breaking.

What to do.—Give tonics and stimulants internally; give recipes No. 37 and No. 35; if much depression exists, give No. 65. Feed on boiled oats, barley, etc. Apply locally No. 24, and keep the part wet with it continually. If the swelling spreads in spite of this lotion, paint the healthy skin for two inches all around the diseased part with tincture of iodine, and change the lotion to the following:

No. 70. 1 Ounce tincture muriate of iron,
8 Ounces water,
Mix.

Keep the surface wet with it till the skin begins to be irritated; then go back to No. 24. If extensive sloughing takes place, poultice with oil-cake meal, with charcoal sprinkled over the poultice, till a healthy sore is obtained; then apply lotion No. 7. If the erysipelas comes from an unhealthy sore, canterize it with powdered bluestone continuously, once a day, till all signs of a purplish, unhealthy condition, have disappeared; then continue the lotion No. 7. Continue the tonics for several weeks, giving soft food enough to keep the bowels loose.

CHAPTER XIV.

CONTAGIOUS BLOOD DISEASES.

I. GLANDERS AND FARCY.—II. STRANGLES.—III. RABIES OR HYDROPHOBIA.—IV. HORSE POX OR EQUINE VARIOLA.

Diseases are said to be contagious when they reproduce themselves in a healthy animal, either by inoculation and absorption of the virus into the system through a wound or mucous membrane, or by absorption of disease germs floating in the air or in the water that the animal drinks.

I. Glanders and Farcy.

These are different forms of the same disease, which is a specific poison that affects the whole system. When it breaks out in the nose, affecting also the lungs and lymphatic glands between the branches of the lower jaw, it constitutes glanders; when it attacks the lymphatic glands and other tissues of the legs and body, it constitutes farcy. The two forms of disease often exist separately, but usually symptoms of both will be found in the same case. The contagion lies in the discharges from the ulcers, either those in the nose or farcy buds; it is contagious only by inoculation, the poison being of heavy specific gravity and not volatile. The virus from glanders may produce glanders or farcy, or both; the virus from farcy may do the same. The mode of inoculation is usually through the nose or mouth, by the introduction of the virus taken by one horse working in double harness with a glandered horse, or standing in the same stall, rubbing his nose on a hitching post or fence or edge of a water trough where a glandered horse has stood. These latter are common channels through which glanders is got: for when a glandered horse is driven up to a post or water trough, the first thing he does is to rub the accumulations of matter off his nose, the clogging of which is uncomfortable. And so great is the vitality of the virus, that a horse coming along an hour, a day, a week, or even a year after, and happening to rub his nose on the same place gets the disease by inoculation.

The poison may lie latent in the system a week, or a month, or two months and then break out, perhaps violently, and run the acute course, causing death in three to six weeks; or the disease may appear in a very mild form and run the chronic course, so that the horse may live in very

comfortable condition for one to three or four years, though sowing the seeds of contagion for other horses to gather all the time, thus doing an inestimable amount of harm.

When the disease breaks out, it does so by ulceration of the tissues involved. These ulcers differ from ordinary ones, by their resistance to treatment; if made to heal, they break out again either in the same or another place, and have a tendency to spread and slough, eating away the tissues till the ulcers become confluent and the *Schneiderian* membrane (partition in the nose) is destroyed. The disease was known in the earliest times, and was written on by Vegetius, Ronan, and many others; but it was not well understood as to its actual seat till La Fosse discovered that it lay in inflammation and ulceration of the nasal membrane. The poison of glanders and farcy is communicable to men, goats, sheep and dogs, with all the characteristic symptoms of the disease in horses, and is contagious from man back to the horse or ass.

Causes.—It is usually propagated, fostered and extended by contagion through the villainous traffic carried on in glandered horses by unscrupulous dealers. For many diseased animals retain the appearance of health sufficiently well to be bought and sold many times, the dealers explaining the discharge from the nose as coming from a cold, and the swollen legs as resulting from impurities in the blood; and Tom, Dick and Harry, thinking they "know all about a horse," buy the animals, believing the explanation of the dealer to be true; and thus thousands of dollars worth of stock is ruined each year by the spread of this fatal disease.

But the disease sometimes arises spontaneously in armies, on ship-board, or in overcrowded, low, damp, badly-ventilated stables. Overcrowding is the chief cause of its spontaneous appearance, the horses, asses or mules being compelled to breathe over and over again, air vitiated by the emanations from their own fœcal matter and from their bodies, and

GLANDERS.

The first stage of glanders showing a watery discharge from the nose.

GLANDERS.

When the discharge has become muco-purulent.

EXAMINATION

Of the nostril for glanders.

which has been exhausted of its oxygen by passing through the lungs a number of times.

How to know it.—Acute glanders is characterized by languor; dry, staring coat; red, weeping eyes; loss of appetite; quick pulse; elevated temperature, the thermometer registering 103° to 106° F.; accelerated breathing; a grayish purple color of the lining of the nose; a watery discharge, which soon becomes yellowish and sticky, causing the hair on which the matter accumulates in and around the nostrils to stick together. The discharge looks like melted butter, and when dropped into water it sinks. The glands under the jaw swell and often adhere to the bone, but not always. The partition between the nostrils will become ulcerated; small yellow points with purple bases will come up and burst, making the discharge bloody for the time. These ulcers, with elevated edges and depressed centers and purple bases, will spread and become confluent, eating away the membrane till little or nothing of it is left; the discharge increases and has a horribly offensive odor; the lungs become affected by ulcers forming in them; the breathing becomes labored, and the animal finally dies, the most emaciated and disgusting object imaginable.

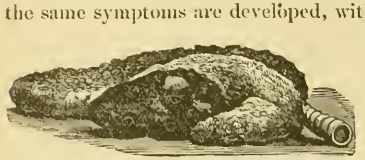
GLANDERS,

When the discharge has become purulent.

GLANDERS,

In the last stage when the pus is mixed with blood from extensive sloughing.

The chronic course is longer continued and runs less rapidly; but all the same symptoms are developed, with the exception that the appetite is less impaired till near the last; the discharge is less copious and offensive, and emaciation does not take place so rapidly. But if the horse is exposed to any degree of hardship and cold storms, the chronic form may run into the acute form at any time. The cough is not always noticed, and the ulcers are sometimes so far up in the nose as to be out of sight. It is often necessary to inoculate a worthless animal in order to determine the disease. If it is glanders, it will probably prove fatal to the one inoculated in two or three weeks, running the acute course.



SECTION OF A LUNG

Of a glandered horse, showing the existence of tubercles.

Farcy is recognized by swelling of the legs affected, usually one or two, though sometimes all four. The swellings are along the lines of the lymphatic veins on the legs, belly or any part of the body; small nodular points come up, which break and discharge a glairy unhealthy pus, run a few days, dry up and leave a scar or bare spot that usually lasts to tell the tale as long as the horse lives; other nodules follow and spread nearly all over the body, head and neck; the swelling of the limbs does not

yield to treatment, and they soon become chronically enlarged. The discharge is contagious the same as that of glanders. Farcy sooner or later runs into glanders and terminates fatally.

What to do.—Treatment should not be attempted at all, for it is always fatal in spite of the most scientific and persistent efforts; the fatal termination may be postponed for a while, but the animal is sowing the contagion all the time, and doing an inestimable amount of damage. The fact that the disease is contagious to men, and always fatal too, is another reason why no man should attempt to treat a case a moment after it is satisfactorily diagnosed. When any doubt exists, or a suspicious case is seen, isolate the animal at once and quarantine him; prevent any communication with other animals, and await developments. The discharge of catarrh being whitish and more mucous in character, is easily recognized, and the nasal membrane never assumes that mouse-eaten appearance that is seen in glanders. Shoot every animal known to be affected with glanders, and bury the carcass very deep.

Prevention.—Avoid overcrowding and poor ventilation. See to it that no affected animals are allowed to run at large, or even to be used about the place in any way; avoid letting horses drink any more than is absolutely necessary in public troughs. Either tear down and burn any infected stable, or have it disinfected under the supervision of a qualified veterinary surgeon. All suspected cases should be placed under his charge till the doubt is settled.

It should be made a criminal act, with a heavy penalty, to expose affected animals in public places, or to sell or offer them for sale. A health commission of three qualified veterinary surgeons should be empowered to destroy glandered horses, with or without the consent of the owner; and the State should bear half the loss, by reimbursing the owner with half the value of the animal before he took the disease. It is a misfortune for which he is not to blame, and which the State should help him to bear.

II. Strangles.

Strangles is a specific blood poison, peculiar to horses, and usually confined to young ones. It depends upon a morbid condition of the system, is contagious, and corresponds to children's diseases in human medicine. It is most common in damp, cold seasons. The poison in the blood manifests itself in large, phlegmonous abscesses around the throat; this is the usual manner in which it breaks out. But in some cases it takes a very different course, breaking out in abscesses on any part of the body. Sometimes no abscesses gather at all, and the fever remains diffused in the system, instead of coming to a head in one place. These

last two kinds are called bastard or unusual strangles. It is often fatal, but such cases are due to neglect, to colds from exposure while the fever is high, etc.

Causes.—It often arises spontaneously, from the existence in the system of some morbific matter developed while growing; for spontaneous cases are only found among young horses; when older ones have it, it comes from contagion.

How to know it.—There are all the indications of fever—quick, weak pulse; high temperature; hot mouth; cold extremities; staring coat; loss of appetite, and nervous prostration. In a few hours the throat begins to swell, both on the sides and between the branches of the lower jaw; this swelling is sometimes immense, and makes the colt hold his neck and head stretched out in one position, stiff, like a child with the mumps. There is usually a distressing cough and inability to swallow; often there is a desire to eat, but the throat is so sore he cannot swallow. The nose runs a mucous discharge at first, which soon becomes purulent; the eyes very red, and tears run down over the cheeks. The swelling is painful and sore upon pressure, and usually breaks in about a week, and discharges pus. When these swellings come in the lungs, the breathing will be affected, and the chest will be sore upon pressure or percussion on the ribs, and he will stand all the time. If it comes in the abdomen, colicky pains are felt, and he lies down nearly all the time. Sometimes it comes around the heart. Any of these unusual forms are likely to be fatal.

A BAD CASE OF STRANGLES.

What to do.—Avoid depletives of all kinds, and foster the strength of the patient in every possible way. If the bowels are constipated, give a few injections, but do not risk a purgative; give recipe No. 40 every two to six hours with a syringe, for it is unsafe as well as painful, to try to drench him with the throat in that condition. Apply hot linseed poultices to the swellings, and let them get very thin indeed before opening them; or, even let them burst of themselves to avoid that thickening often seen after being opened. It is no use trying to check it; it must run its course. Give him a warm, dry place, well ventilated, and nourishing food such as boiled oats, barley, roots, etc. During convalescence give recipe No. 35.

III. Rabies or Hydrophobia.

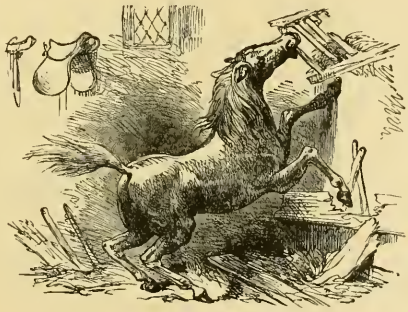
This is a specific blood poison, arising spontaneously in the *genus canis* (dog, fox and wolf) and in cats. It is communicable to all animals and to man, but can only be inoculated by a bite. The virus lies in

the saliva and blood, but not in the milk. Nearly all animals bitten by a rabid dog, are attacked with the disease in the course of time, but man seems to possess a partial immunity; only a small percentage of the men bitten by rabid animals have rabies.

Incubation.—The period of incubation varies in different animals. The horse goes fifteen to ninety days, usually thirty; cattle, twenty to thirty days; sheep, twenty to seventy-four days; swine, twenty to forty-nine days. In man the period of incubation varies from a few days to a few months, though some cases develop after a year or so, or even longer, the rabies at last being more the effect of fear and long continued anxiety and worry over the possible effects of a bite, than of the bite itself.

COUNTENANCE OF A HORSE WITH RABIES.

How to know it.—The horse becomes frantic with fever and pain; delirium sets in early; he neighs, paws, bites his manger, clothing, etc.; is ravenous for water but swallows with difficulty; he grows worse till death takes place by paralysis.



DESTRUCTIVE IMPULSE OF HYDROPHOBIA.

What to do.—No treatment is of any avail; if there were anything that could be given, it would be too risky to attempt it; but so far, science has discovered nothing to prevent a fatal termination. As soon as a case is suspected isolate the horse, tie him so that he shall be powerless for harm, and await developments. As soon as it is satisfactorily recognized destroy him.

IV. Horse Pox or Equine Variola.

Nearly all animals have a pox peculiar to their kind, although all forms of pox seem to be closely allied. They are all contagious from one animal to another of the same species, and usually among the different species to a greater or less extent. Having any of the different kinds of variola once, gives immunity from subsequent attacks of the other kinds, for a number of years at least. Kine pox, taken either by inoculation from the cow or by vaccination, confers immunity, to a great extent, from small pox. Horse pox appears to be identical with kine pox; the one can not be distinguished from the other when inoculated into man, ox or horse.

Horse pox usually attacks the limbs, but sometimes the face, flanks and other parts of the body.

How to know it.—There is slight fever, which is often unnoticed; heat and swelling of the affected part for a day or two; then hard nodules form, increasing in size to about half an inch in diameter; the hair ruffles up and the skin reddens around the pock; on the ninth to the twelfth day, a limpid, yellowish fluid flows from the pustules, and sticks the hair up in yellowish scabs or streaks, on the removal of which a red, raw depression is seen with the scab fixed in its center. In three or four days the secretion ceases, the pustules dry up, and the part heals and the scabs come off.

The most active virus is the lymph that runs from the pustules. It is readily carried from horse to horse by the grooms on their hands or clothes. It sometimes exists to almost to an epizoötic extent in some localities. The grooms often get inoculated and have the horse pox, which saves them the trouble of being vaccinated.

What to do.—It must run its course, so all that is necessary is to give laxative diet; keep the parts clean by bathing with warm water once or twice a day, and grease them over, when dry, to prevent itching and pain from the scabs getting too hard and dry. If the fever should run high and the appetite suffer, and the urine become dark and scanty, give recipe No. 23.

CHAPTER XV.

DISEASES OF THE URINARY ORGANS.

I. NEPHRITIS OR INFLAMMATION OF THE KIDNEYS.——II. CONGESTION OF THE KIDNEYS.——III. CYSTITIS OR INFLAMMATION OF THE BLADDER.——IV. PARALYSIS OF THE BLADDER.——V. EVERSION OF THE BLADDER.——VI. SPASM OF THE NECK OF THE BLADDER.——VII. RUPTURE OF THE BLADDER.——VIII. DIABETES INSIPIDUS OR PROFUSE STALING.——IX. HÆMATURIA OR BLOODY URINE.——X. SUPPRESSION OF THE URINE OR DYSURIA.——XI. DRIBBLING OF THE URINE OR ENURESIS.——XII. STRICTURE OF THE URETHRA.——XIII. GONORRHŒA OR GLEET.——XIV. FOUL SHEATH.——XV. URINARY CALCULI.

Diseases and derangements of the urinary organs are far less common than the majority of people suppose. Whenever a horse has the colic or pleurisy, the average horseman attributes the pain to the ravages of bots or to stoppage of the water, and goes to work to start the latter and quiet the former. Many are the nostrums that are given, sometimes harmless and sometimes very irritating and injurious.

SYMPTOMS ATTENDING DISEASES OF THE URINARY ORGANS.

Many of the diseases mentioned in this chapter are often seen, by a veterinarian who has an extensive, active practice. Diseases of the kidneys are either organic or functional, usually the latter.

I. Nephritis or Inflammation of the Kidneys.

Causes.—The usual causes are too free use of diuretic medicine, and blistering on the back with fly blister; eating musty hay and kiln-dried

oats; getting chilled by standing under the eaves where water drips upon the loins; and extension to the kidneys of inflammation of surrounding parts from blows and other injuries.

How to know it.—There will be very profuse sweating, great pain from the inelastic character of the capsule covering the kidneys; the horse straddles in walking, and is loth to move; high fever; elevated pulse, temperature and respiration; heat and a slight humping up of the back; great tenderness upon pressure in the region of the loins, especially when applied to the sides just under the transverse spines of the loins; the pain is colicky in character, and more severe at times than at others; he looks around to his flanks and is almost continually trying to stale, and passing a little at a time, and that very red and thick, sometimes mixed with blood and pus. It runs on to suppuration, and sometimes to gangrene, and death. When once well set in, it is very hard to control.

TEST FOR INFLAMMATION OF THE KIDNEYS.

What to do.—Examine the case carefully to be certain of the location of the trouble; then apply hot water rugs across the loins continuously for several days. Give internally a quart of raw linseed oil. As soon as this is well down, give recipe No. 30, and follow it up every two hours. If no relief comes in the course of five or six hours, give copious mucilaginous drinks in the form of flaxseed tea and slippery elm bark. Clothe warmly, to encourage sweating. Freshly-flayed sheepskin may be laid across the loins, or mustard paste may be rubbed into the hair, and the rags applied over it. Feed on short, laxative diet. Avoid diuretics strenuously, especially nitre and spirits of nitre. Give anodyne injections of warm water and one ounce of laudanum, once an hour. Keep the patient quiet and avoid over-feeding.

II. Congestion of the Kidneys.

This is a constitutional disease affecting all parts through the blood, in which lies the cause of the internal lesions; but as it affects the kidneys most, and the kidney symptoms being most noticeable to the average observer, we describe it under this head.

Causes.—Too plethoric a condition of the system is the great cause. The blood gets so fat and thick that it interferes with the working of the internal organs, especially the kidneys. The animal is usually fat, but not necessarily so, for it is often seen in horses in strong, working condition, but thin in flesh. In *post mortem* examinations, fat can be seen floating in globules in the blood. It gives rise to thick, coffee-colored, ropy urine.

HORSES WITH CONGESTION OF THE KIDNEYS.

The muscles in the loins swollen, etc.

On account of its effect on the urine, the disease has been called *Albuminuria*, from the supposed existence of albumen in the urine; *Azoturia*, from the abundance of urea the urine is thought to contain; *Plethoric congestion*, from congestions in the system, due to plethora. The latter name is the most appropriate, as there is no albuminous urine and not any great increase of urea in this disease, but the name under which we describe it is readily comprehended and the trouble easily located by the average observer.

How to know it.—The animal is accustomed to hard work or regular exercise, and high feed; he may be laid up from a nail wound, etc., for a few days or a week; the feed is kept up the same as though he were at work; he gets well, and goes out hopping and prancing like a colt, goes about half a mile or so, begins to sweat profusely, lathers up well, gets stiff in the left hind leg, and is inclined to drop it. Then the trouble extends to the other leg; the horse becomes weak across the loins,

staggers behind, blows hard, and is pressed for breath; he goes on for half a mile or more in this manner, and then comes down in a heap, perfectly helpless, unable to rise, and has the appearance of being paralyzed behind. He is unable to pass urine, which, when drawn off with a catheter, is thick, ropy, dark, coffee-colored. Swelling of the muscles over the loins is seen, and they are very painful and sensitive to pressure, as are also the kidneys, if examined per rectum. There are severe, colicky pains or cramps, in which he will throw himself around, try to get up, will get up forward, and will sometimes drag himself all over the territory allowed him. Inflammation of the kidneys follows, and runs on to suppuration and death in the course of four to fifteen days.

What to do.—Knowing the origin of it to be plethora, the rational treatment is to deplete; give No. 48 internally, and also frequent injections of warm water; apply hot rags to the loins continuously, and give a great abundance of flax seed tea to drink; if he will not drink it, drench him with it liberally; give nothing to eat for a day or two. Tie his feet if he is inclined to struggle much. When he is able to get up, put him in slings; keep him on short feed; and during convalescence give gentle exercise. Be chary of diuretics. If the case has run on for a week or more, give No. 4, but only three times a day, in a little water. Draw off the urine three times a day, till he can pass it without assistance.

III. Cystitis, or Inflammation of the Bladder.

Causes.—Too free use of diuretic medicine; too free application of fly blisters and turpentine to the back or other extensive surfaces; acrid diuretic plants in the food; prolonged retention and partial decomposition of urine, and irritation from calculi.

How to know it.—Colicky pains; looking around to the flanks; frequent painful evacuation of urine in small quantities, with more or less mucous and epithelium from the lining of the bladder; straining; high fever; mouth hot; respiration and pulse quick; tenderness on pressure just in front of the pubic bone of the pelvis, and same upon pressure in the flanks. The loins are rigid; the bladder is tender to the touch per rectum—or in the mare, per vagina; if examined by running the finger into the bladder, the walls will be found to be thickened; the tail is switched continuously; the gait is stiff and straddling. If the neck of the bladder is affected, the urine escapes involuntarily; if there is a stone in the bladder, it can be felt by inserting the hand into the rectum.

What to do.—Remove the cause, if possible; stop diuretic medicine of all kinds; give large doses of flaxseed tea, and injections of warm water; give a laxative of linseed oil, one pint, and soft diet and pure water at

will; also, a long rest. Avoid diuretic medicine ever after, as the parts once affected are more tender and susceptible.

IV. Paralysis of the Bladder.

Causes.—Long continued distension of the bladder from the urine being held, as in lockjaw, rheumatism or any disease that confines the horse to a lying position.

How to know it.—The urine dribbles away as it is formed, and decomposes, setting free ammonia, which scalds all parts it comes in contact with; the urine scalds the sheath and the inner sides of the thighs and legs. This disease often results in inflammation of the bladder, and sometimes follows partial paralysis.

What to do.—If the trouble originates from paralysis, give that its proper treatment and draw off the urine several times a day with a catheter to prevent distension.

V. Eversion of the Bladder.

Causes.—This affects only females, and results where labor is very protracted, or from straining in cystitis; the bladder is forced back in the pelvis and turned wrong side out.

How to know it.—The bladder will be seen protruding from the lower part of the vulva, a round, red, fleshy looking substance, and the entrance of the ureters (tubes from the kidneys) will be plainly seen near the neck of the bladder, with the urine dripping from them.

What to do.—Bathe the bladder with tepid water and laudanum in the proportion of an ounce of laudanum to a pint of water: then press it gently and continuously till it is returned to its place. Great care will be needed to avoid pushing the fingers through the walls of the bladder, especially after it has been out some time and become swollen. If it is inclined to come out again, after being returned to its place, put on a compress to hold it in.

VI. Spasm of the Neck of the Bladder.

Causes.—It is caused by long retention of urine when the horse is being driven or ridden; nervous irritation; becoming chilled when heated. It is a common occurrence during colic, the urine flowing freely when the colic subsides; males are more subject to it than females.

How to know it.—Frequent attempts to pass water, which is forced out in small quantities by great straining; colicky pains; looking at the flanks; tenderness in the lower back part of the belly; by introducing the hand into the rectum, the bladder will be felt full and distended on the floor of the pelvis.

What to do.—Spread fresh litter under the horse to induce him to pass the urine; give warm water injections and antispasmodic drenches, such as No. 50; gentle pressure on the bladder per rectum is sometimes sufficient, but be very careful not to overdo it for fear of rupture. Pass the catheter up the penis if necessary; in the case of a mare all that is necessary is to insert one finger into the neck of the bladder.

VII. Rupture of the Bladder.

Causes.—This only occurs in females during parturition when the bladder has failed to be emptied before the labor is begun, and in cases of long continued spasm of the neck of the bladder—especially, if by frequent repetitions of the spasms the walls of it have become weakened and flaccid.

How to know it.—Nervous trembling of the whole body; accelerated pulse; cold extremities; nausea; abdominal pain that runs on to inflammation and causes death, or the animal dies from the nervous shock. Examination per rectum finds the bladder empty and flaccid; introduction of the needle of a hypodermic syringe, or a small trocar into the median portion of the belly, will let out urine which is readily recognized by the odor.

Nothing can be done.

VIII. Diabetes Insipidus or Profuse Staling.

This is a superabundant drain of water from the system through the kidneys.

Causes.—Excessive and long continued use of diuretics in acute diseases, especially lung troubles; acidity of the stomach and chronic indigestion, causing much thirst, so that great quantities of water are drunk. Musty hay and kiln dried oats are frequent causes.

How to know it.—By the excessive thirst; profuse staling, flooding the stall; the urine is copious in quantity, frequently voided and as clear as water. Emaciation and hidebound soon follow. The appetite is capricious; the coat staring; slight fever; inclination to lick the walls and mortar to get lime, and to eat the bedding in preference to clean, fresh food. There is weakness, and palpitation of the heart.

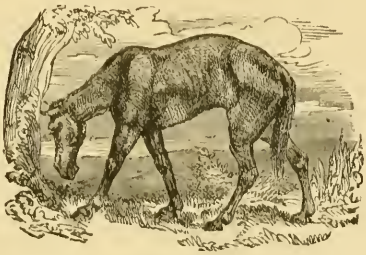
What to do.—Give one or two doses of the following recipe:

No. 71. 1 Drachm iodine.
½ Drachm iodide of potash,
Powder and mix with linseed meal to make a ball.

Give as one dose and repeat it once a day for two or three days; then give a teaspoonful of bicarbonate of soda in a bran mash, morning and night for a week; then give recipe No. 37, and give a complete change of food—a run at grass if possible.

IX. Hæmaturia or Bloody Urine.

Causes.—This is caused by violence, affecting the loins, kidneys, bladder, etc.; by cancer, tubercle, or abscess in the kidneys; by acrid diuretic plants, etc.



HORSE SUFFERING FROM BLOODY URINE.

What to do.—In case there is a profuse flow of blood, dash cold water over the back. Remove the causes, if they can be located, and give flaxseed tea to drink, and recipe No 70, in doses of two tablespoonfuls, three times a day.

X. Suppression of the Urine, or Dysuria.

Causes.—This is retention of the urine from various causes, such as contraction of the sphincter of the bladder; enlargement of the prostatic gland; stricture of the urethra; bean in the head of the penis, and calculi.

What to do.—Pass in the catheter to empty the bladder, and then endeavor, if possible, to find the cause and remove it. If it is from enlargement of the prostatic gland, give No. 66; if from contraction of sphincter of the neck of the bladder, refer to the treatment for spasms of the neck of the bladder; if from stricture, refer to the article on that subject; if from a bean in the head of the penis, oil your fingers well and remove it; if it is from calculi, refer to that subject.

XI. Dribbling of the Urine, or Enuresis.

In this case the urine dribbles away involuntarily. It may come from weakness of the sphincter of the bladder, or from injury to it by the catheter, or from paralysis of the bladder. Care should be taken, when passing in the catheter, to pass one hand into the rectum to guide the point over the curve. It may come from calculi; if so, remove them. If it comes from weakness, give a change of food, and No. 37 as a tonic.

XII. Stricture of the Urethra.

Causes.—This is caused by irritating ingredients in the urine, and by strong astringent injections used in gleet; or by the healing of ulcers in neglected gleet.

How to know it.—The urine is passed in a very fine stream: the passage requires a long time, and is attended with pain. There are frequent painful erections.

What to do.—Pass in, daily, a catheter, beginning with one small enough to pass the stricture, and increase the size of it from day to day, pushing it by the stricture with gentle pressure.

XIII. Gonorrhœa.

Causes.—This is inflammation of the urethra from irritating substances in the urine; excessive copulation; masturbation; connection with a newly delivered mare or one that has an irritating discharge from the womb; mechanical injury to the penis, and irritation from the passage or arrest of small stones or gravel. It is mostly confined to stallions.

How to know it.—By swelling and soreness in the sheath and penis; painful, slow urination, frequently interrupted and sent in jets, owing to the pain; more or less discharge of pus, which will be seen around the head of the penis.

What to do.—Give a pint of raw linseed oil as a laxative, and foment the sore part with hot water; rinse out any gravel, and inject a lotion made as follows:

No. 72.
½ Ounce sugar of lead,
1 Ounce vinegar,
1 Quart water.
Mix.

Inject a little once a day. If it is necessary to continue this longer than a week, change to

No. 73.
15 Grains nitrate of silver,
½ Pint water.
Mix.

Inject a little twice a day. Feed on soft food.

XIV. Foul Sheath.

The sheath of most horses needs cleaning occasionally. The glands in the skin secrete a fluid to lubricate the parts, and at times it is secreted in larger quantities than at other times, and accumulates in a gummy, black substance in the sheath. Wash it out carefully with soap and warm water, being careful not to use any violence in drawing down the yard,

and particularly careful not to scratch the parts with the finger nails. If this occurs the yard may swell to enormous proportions; if so, bathe it with warm water and suspend it in a wide bandage passed over the loins. Repeat the bathing two or three times a day. Give gentle exercise; and when the swelling is nearly gone, oil it with olive oil.

XV. Urinary Calculi.

Stones or calculi in the urinary apparatus differ in size, chemical composition and location. Sometimes they attain to very large sizes; sometimes several small ones exist in the same place, and sometimes the deposit is sand-like, the granules not uniting to form a stone.

Their chemical composition differs according to the nature of the food. The calculi of herbivorous or grazing animals are composed mostly of the carbonates, while those of carnivorous or flesh eating animals consist mainly of the phosphates. The calculi of omnivorous animals partake of the character of the two kinds just mentioned. They will be more largely composed of the carbonates or of the phosphates according to the character of the food and water taken.

Causes.—The carbonates of lime and magnesia are the principal components of the calculi of horses and cattle; they are due to the large proportion of vegetable acids in the food. These vegetable acids become transformed into carbonic acid, which unites with the lime and magnesia in the blood, thus forming calculi. The tendencies to form calculi from the food are strengthened by the following accessory causes: Scarcity of water; disinclination to drink; excessive loss of water from the system by diarrhœa and dysentery or profuse sweating; feverish conditions, giving rise to scanty secretions of urine; dry winter fodder; and hard drinking water.

A solid substance of some kind for a nucleus or starting point is usually necessary to their formation; around this nucleus the salts crystallize in concentric layers. The nucleus may be a particle of mucus, fibrine or blood, or a foreign body introduced with the catheter.

The locations in which they may be found are the kidneys, ureters (the tubes leading to the bladder), the bladder, the urethra and the fossa of the glans penis.

How to know it.—Those in the kidneys and ureters cause colicky pains, straddling gait, tender loins, and sometimes blood in the urine. Those in the ureters can sometimes be felt by the hand introduced into the rectum.

Those in the bladder get into the passage and obstruct the urine occasionally, in which case they give rise to frequent straining efforts to pass urine; the urine escapes in driblets and jets, with frequent sudden arrests of the flow; but if the stone does not get into the passage, the flow is not

checked. Blood, in clots, may be passed from wounding of the mucous membrane of the bladder, by the stone. Examination by the hand, per rectum, will determine its existence. In the female, it can sometimes be reached with the finger.

What to do.—There is no satisfactory treatment in cases where the location of the stone is out of reach. Those in the bladder and urethra can be removed by either breaking them down and washing the fragments out (lithotrity), or they may be removed whole (lithotomy); both operations will be found described in the chapter on operations.

Prevention.—It is well to guard against the formation of them in the first instance, and to prevent their return when removed. If any fault exists in the feeding, correct it; give a reasonable amount of common salt, twice a week to horses, and to cattle three times a week; also give an abundant supply of good water. If the water is hard, put a little caustic soda or potash into it once a day, or a little hard wood ashes. Give roots to eat if in winter, and grass in summer; give half an ounce of tincture of gentian morning and night for a fortnight, or a tablespoonful of powdered gentian or quassia morning and night in soft food.

CHAPTER XVI.

DISEASES OF THE ORGANS OF GENERATION.

OF THE MALE:—I. INFLAMMATION OF THE TESTICLES.—II. HYDROCELE, OR DROPSY OF THE SCROTUM.—III. EVIL RESULTS OF CASTRATION.—IV. WOUNDS OF THE PENIS.—V. GONORRHŒA.—VI. PHIMOSIS AND PARAPHIMOSIS.—VII. MASTURBATION.

OF THE FEMALE:—VIII. PARTURITION.—IX. METRITIS, OR INFLAMMATION OF THE WOMB.—X. INFLAMMATION OF THE OVARIES.—XI. LEUCORRHŒA.—XII. PUERPERAL FEVER.—XIII. MAMMITIS.—XIV. HYSTERIA.—XV. ABORTION.

Horses as a race do not suffer with these diseases as much as cattle and other lower animals, probably on account of their greater activity, which is conducive to health, that of the organs of generation as well as of other parts of the body.

I. Inflammation of the Testicles.

This usually occurs as a result of external injury, but is sometimes the result of excessive copulation, glanderous deposit, or a localization of other morbific conditions of the system. There will be more or less tumefaction, great soreness, some fever and a straddling gait.

What to do.—Give a purgative, No. 23; also, give No. 16 in the feed, which should be light and soft, grass if possible. Spread over the organ a little solid extract of belladonna once a day, after hot fomentations. Give gentle exercise, but allow rest from active male service for a week, or longer if necessary. Should it go on to suppuration, open it and inject lotion No. 39. If it becomes calloused, hard, and does not diminish in size, substitute lotion as follows:

No. 74.
1 Drachm iodine,
1 Drachm potassium iodide,
½ Pint water.
Mix.

Inject a tablespoonful into the organ twice a day, and apply some on the outside. If treatment fails, castration must be resorted to. (See chapter on operations.)

II. Hydrocele, or Dropsy of the Scrotum.

The scrotum is the pouch or bag that contains the testicles. Dropsy of it is due to the effusion following an injury thereto. It will be found enlarged, tender, soft and fluctuating.

What to do.—Draw off the water with a small trocharand cannula; repeat it, if necessary, half a dozen times, for these cavities are prone to refill. Paint the outside with tincture of iodine. If all means fail and the case becomes hopeless, resort to castration. (See chapter on operations.)

III. Evil Results of Castration.

Scirrhus cord.—When the cord is left too long, the ends hanging down between the lips of the wound made in the scrotum, it becomes adherent to them, and the whole swells together, becoming an indurated mass, sometimes as large as a child's head.

What to do.—The horse must be cast, the cord dissected away from the scrotum, and the cord (which will be found in the form of a tumor) excised. In the absence of a good veterinarian, excise it with the ecrazeur, taking pains to get down low, so as to take out as much of it as possible, and dress it, twice a day, with lotion No. 5.

Abscess in the scrotum.—This occurs from healing of the wound before the suppurative process, which always follows to a greater or less extent, is finished. The confined pus accumulates and forms a large abscess, causing the sheath to swell, as also the lymphatic glands on the inside of the thigh, giving rise to a straddling gait and disinclination to move.

What to do.—Open it freely, and evacuate the pus, when it will commonly heal readily; if it does not, however, inject lotion No. 5, twice a day.

Projecting cord.—Sometimes a small teat-like piece of the cord will project through the wound in the scrotum, preventing it from entirely healing. Pinch this off close to the scrotum with the thumb nail, and cauterize it with lunar caustic.

Tumors on the cord.—These may form from catching cold after castration, strangulation of the cord, or too rough handling. They sometimes attain the size of a child's head. The tumor differs from scirrhus in being situated higher up in the canal. It must be dissected out, the same as scirrhus cord above described.

IV. Wound of the Penis.

This sometimes happens to stallions while teasing mares; it gets kicked, swung against a fence, or struck by mischievous boys in play. Sometimes amputation is necessary. (See chapter on operations.) When an operation is not necessary, foment with hot water and apply lotion No. 24, two or three times a day. If tumefaction is great, support the penis with a bandage passed over the loins.

V. Gonorrhœa or Gleet.

This is catarrh of the mucous membrane lining the urethra. Its causes are excessive work in the stud, connection too soon after parturition, or irritating substances in the urine.

How to know it.—The urine will be passed in small jets, with frequent interruptions and manifestations of pain, and there will be some swelling and soreness of the parts.

What to do.—Suspend the labor in the stud for a couple of weeks; foment with hot water frequently, and inject the following lotion twice a day: (See also page 408,—treatment for another type of this disease.)

No. 75. 2 Drachms sulphate of zinc,
1 Pint water,
Mix.

Or, instead, the following may be used:

No. 76. 3 Drachms sugar of lead,
1 Pint water,
Mix.

VI. Phimosis and Paraphimosis.

These are swollen conditions of the penis. In the former, the penis is swollen and confined within the sheath, so that it cannot be protruded; in the latter, the penis is swollen outside the sheath, and cannot be withdrawn.

What to do.—When phimosis exists, open the external portion of the sheath, so as to enlarge the opening; then, if the penis is swollen when liberated, bathe with cold water, and apply lotion No. 24 three times a day.

For paraphimosis, bathe with cold water, apply lotion No. 24, three times a day, manipulate as much as the soreness will allow, and support the penis with a bandage passed across the loins. Do not, on any account, omit the bandage, as the weight of the swollen organ is alone sufficient to keep it irritated and inflamed. If this fails to accomplish the desired effect, the rim of the sheath may be slit up a little ways, and the organ manipulated and pushed back. Leave the cutting, however, for the last resort.

VII. Masturbation.

This is a bad habit of abusing nature, that some stallions get into. It may result from weakness, consequent upon overwork in the stud, or, on the other hand, from superfluous passion attending want of work in connection with high feeding. When from the former cause, reduce the work, give walking exercise, and administer tonics, such as Nos. 67, 35 or

33. When from the latter, give, for a purgative, No. 23, reduce the feed, increase the exercise, and give No. 37.

DISEASES PECULIAR TO THE MARE.

Diseases of the generative organs are not so numerous in the mare as in the cow, probably owing, as before explained, to her leading a more active life.

VIII. Parturition.

This the mare gets through with very quickly when everything is right, but when it goes wrong or is prolonged, on account of malpresentation, or malformation of the pelvis, the case is very bad indeed. The cow may be in the act of calving many hours, and come out all right, if she gets the right kind of assistance, but the mare, if not relieved, may die inside of an hour. Do not interfere, however, unless absolutely necessary in consequence of delivery coming too soon, (as from some external violence), and before the ligaments of the pelvis are relaxed to allow the fœtus to pass, or of some malpresentation. In such cases, assistance, to be of any service, must be rendered soon and efficiently.

The mare should be strong and in good healthy condition; as to flesh, not too fat nor too thin, and strong, as a result of proper exercise. The bowels should be loosened by giving soft feed, roots, etc., at the close of the period of gestation. In the great majority of cases, little or nothing else is necessary.

What to do.—In case of malpresentation, refer to the corresponding position in the cow, which will be found described in its proper place. If all means fail to deliver the foal alive, and one or the other must be sacrificed, cut the foal away, piece by piece; but if the foal is alive and the mare cannot be saved, the foal can be brought away by the Cesarian operation. (See chapter on operations.)

Dead fœtus.—Sometimes the fœtus dies some considerable time before the full term of gestation is completed, and thus becoming a foreign substance, it must be removed. Sometimes, in such cases, the *os uteri* does not relax and needs assistance. This condition of affairs will be known by the mare's continuous and persistent straining, in the effort to expel the fœtus.

What to do.—Pass in your hand, after oiling it with olive oil, and insert one finger into the *os*, then two and three, and so on, working very gradually, till it is well dilated. If this does not succeed, insert a sponge wet with fluid extract of belladonna into the *os*, and let it remain there ten or twelve hours, and then try the hand again.

IX. Motritis, or Inflammation of the Womb.

This results from injury during parturition, or from catching cold by exposure to cold or wet soon after delivery. It usually comes on in two or three days after parturition. There is more or less fever; colicky pain; continually straining, as if to pass another foal; looking around towards the flanks; a discharge of fœtid black fluid from the womb; and arched back.

What to do.—Give a mild purgative of raw linseed oil, in amount from a pint to a quart, according to the size of the patient. Wash out the womb with warm water, to which a little, a very little, whiskey has been added, and inject No. 39. Give No. 18 internally, as often as the fever and other symptoms require. Feed on light diet and keep warm.

X. Inflammation of the Ovaries.

This, though rare, is met with occasionally in the mare, and is manifested by slight fever, soreness on pressure in the lumbar region, and disinclination to walk. It usually occurs at the time of heat, and passes away when that is over; it aggravates the passions excited at that time.

What to do.—Give a teaspoonful of saltpetre in a bran mash, three times a day, for a couple of days.

XI. Leucorrhœa.

This is catarrh of the vagina or of the womb, or of both. Caused, originally, by a slight attack of inflammation, a discharge from the irritated surfaces is set up and soon becomes chronic. It often follows difficult parturition, in which the parts have been torn and injured, more or less. When the after-birth is retained, leucorrhœa invariably follows, owing to the irritation caused by the decomposition, which, in such cases, is nature's only alternative for getting rid of the foreign body.

The discharge is whitish and slimy, of a disagreeable odor; in fact, when following retention of the after-birth, it is often purulent, and very offensive. It tells heavily on the general health of the patient; she loses flesh; the coat becomes rough, coarse and staring; and the milk dries up, or nearly so.

What to do.—Introduce a catheter into the womb, and draw off the purulent accumulations, if any exist; next, inject tepid water, drawing it off with the catheter; then inject lotions Nos. 75, 76 and 39, changing from one to another, and applying them twice a day till cured. At the same time, give, as a course of tonics, Nos. 67, 35 and 22, changing occasionally from one to another. Continue them three or four weeks. Give green food, if practicable; if not, give bran mashes, roots, etc.

XII. Puerperal Fever.

This is a benign fever, usually occurring on the second or third day after parturition. It is aggravated by colds, exposure, or neglect.

How to know it.—The symptoms are those of general fever, accelerated pulse and respiration, with heightened temperature; the ears and extremities, however, are cold; the visible mucous membranes are injected and red; the bowels are constipated; the urine is scanty and high colored; secretion of milk is suspended; and the udder inclines to inflammation and hardness. It may occur in mares of all ages, but is most often met with after the first pregnancy, and seems to accompany the effort of nature in secreting the milk.

What to do.—Keep the animal warm, in a place with good ventilation but no drafts; give soft diet (grass if possible), and plenty of pure water with a tablespoonful of sweet spirits of nitre mixed with it morning and night. If the bowels are constipated, give half a pint of raw linseed oil, repeating it after ten or twelve hours.

XII. Mammitis.

This is inflammation of the mammary glands, or udder; it accompanies parturition, and then always exists to a certain extent, consequent upon the secretion of milk. It is apt to be most severe after the first foaling. Usually, the inflammation subsides in the course of a week or so; that is, as the organs become accustomed to secreting the milk, and their outside is softened by the foal sucking and pulling at the teats; but not infrequently it happens that, instead of getting better and softer, they get harder and larger, sore, hot and painful. When it runs on to suppuration of a quarter, as it sometimes does, the milk curdles and comes away with difficulty, in small quantities, and is bloody. There is always more or less constitutional disturbance, fever, accelerated pulse, etc.

What to do.—Foment vigorously with hot water, as continuously as possible; manipulate to the utmost extent that the soreness will allow; encourage the foal to suck and pull the teats, and milk all you can, at frequent intervals, to prevent the milk from curdling. If it goes on to suppuration, open the abscesses and inject lotion No. 39, twice a day, and apply oil-cake poultices, changing them morning and night. Give soft feed; if in winter, take the chill off the drinking water, and keep the mare blanketed. Give a teaspoonful of saltpetre in a bran mash morning and night. If the bowels are constipated, give a pint of raw linseed oil. Rub the glands with the following, three times a day:

No. 77.
1 Ounce camphor gum,
½ Pint olive oil,
Mix.

XIV. Hysteria.

This is a peculiar and quite rare nervous condition accompanying heat and manifested, principally, by the voluntary muscles. The jaws champ; the teeth are ground; the muscles tremble; the legs and feet are liable to paw, strike or kick spasmodically; in short, the mare acts in a generally delirious manner. Sometimes the brain is so much affected that this condition runs on into tetanic convulsions, inflammation of the brain, and death.

What to do.—Give a quart of raw linseed oil, or else No. 23, and No. 52. Repeat the latter every four to six hours, till purgation takes place, when all unpleasant symptoms will usually disappear.

XV. Abortion.

When mares abort, it is usually the result of accident or overwork. If compelled to draw too heavy a load, a single extra hard pull is oftentimes sufficient to produce abortion; any such accident as slipping, falling, external violence, etc., may likewise bring it about. Usually, all parts come away naturally, without any untoward result other than nervous prostration, and, perhaps, a slight febrile rise in pulse and temperature for a day or two afterwards.

What to do.—Allow absolute rest for a few days, and give soft feed and chilled water. If any fever follows, give a teaspoonful of saltpetre in the mash, morning and night.

CHAPTER XVII.

DISEASES OF THE LIVER.

I. CONGESTION OF THE LIVER.——II. HEPATITIS, OR INFLAMMATION OF THE LIVER (ACUTE OR CHRONIC).—— III. CEROMA, OR FATTY DEGENERATION.——IV. CIRRHOSIS, OR FIBROUS DEGENERATION.——V. JAUNDICE, ICTERUS, OR YELLOWS.—— VI. BILIARY CALCULI, OR GALL-STONES.——VII. HYPERTROPHY.——VIII. ATROPHY.——IX. SOFTENING, OR RAMOLLISSEMENT, WITH RUPTURE.

Diseases of the liver in the lower animals, are not as common as in the human family, but they are met with occasionally, and their effects are plainly visible. The other organs of the body necessarily suffer when there is inactivity of the liver, since its functions are very important, both in eliminating impurities from the blood, and in secreting the bile that largely contributes to maintaining the health of the bowels.

Certain marked symptoms are common to all diseases of the liver, viz: yellowness of all the visible mucous membranes, dullness of spirits, languor, and loss of appetite. When the bile is secreted too abundantly, the feces are bright yellow, with either diarrhœa, or a tendency that way; and when the bile is scanty, the feces are of a gray, ashy color, hard and very offensive to the smell. Again, when the liver fails to secrete its customary quantity of urea, the latter is thrown back into the system, with especial detriment to the kidneys, giving rise to congestion of those organs or azoturia, (which see). The principal diseases of the liver, in the horse, are enumerated in the heading of this chapter.

I. Congestion of the Liver.

This is engorgement of the hepatic blood vessels, and, in a secondary manner, is accompanied by engorgement of many of the other internal organs. Its subjects are commonly high fed, pampered, idle animals. It is frequently a symptom of influenza, from obstruction of the flow of bile, caused by inflammation of the lining membrane of the bile ducts, which, in turn, is simply one manifestation of the general catarrhal inflammation of the mucous membranes of the whole body.

How to know it.—In addition to the general symptoms of hepatic disease, mentioned in the second paragraph of this chapter, there will be some colicky pains; turning of the head towards the right side; high brownish color of the urine; constipation; clay-colored feces; an offensive smell to both feces and mouth; and grinding of the teeth. Sometimes, there is also lameness in the right fore-shoulder, and more or less fever.

What to do.—Some authorities recommend bleeding and purgatives, except when it is a symptom of influenza. In case the animal is fat, bleeding would be an advantage. Follow it with No. 37, given in doses of two or three tablespoonfuls in soft feed, three times a day. Let the food be light and rather sparing.

When there are liver troubles, as a complication of influenza, it is not safe to give them any special treatment. In such cases, treat for influenza, as elsewhere given.

II. Hepatitis, or Inflammation of the Liver.

This may be either acute or chronic. It is very rare in the lower animals, among which it is most often seen in old horses. The inflammation may have its seat either in the covering membrane, known to anatomists as "Glisson's Capsule," or in the glandular portion itself. It may lead to abscesses, or to a hardening or softening of the organ. We will treat, first, of the acute form.

How to know it.—There is marked loss of appetite, and dullness of the eye; the patient usually remains standing, but hangs his head; the manure, passed in small balls, is of a dark reddish-brown color, and sometimes very much mixed with bile, covered with a slimy mucous matter; the urine is scant and high colored, and there is tenderness of the right side.

What to do.—In the acute form, give early, as a mild purgative, No. 23, and follow it with this:

No. 78. 2 Ounces chlorate of potash,
1 Quart water,
Mix.

Give four ounces (about two wine-glassfuls) three times a day. Feed on light diet.

The *chronic form* may follow the acute, or it may exist as an original disease. It gives rise to material changes in the liver, which may become enlarged and softened, or diminished in size and indurated and hardened. In those cases where it comes on gradually, and exists as an original disease, it is the result of want of proper food, or a process of gradual starvation, and tends to a fatal termination. If the food is insufficient and unsuitable, the fact will be shown by a poverty-stricken appearance of the animal generally.

What to do.—Give a complete change in every way possible—location and altitude, as well as in the quality and quantity of food.

III. Coroma, or Fatty Degeneration of the Liver.

This is usually seen in old horses that are very fat. The liver becomes large and soft, and the hepatic cells becoming filled with fat, the secretion

of bile is interfered with. Here we find one of the causes of constipation and enteritis; for the bile is the main agent in keeping the bowels in order, including, also, the prevention of acidity and abnormal waste of the tissues composing them.

No treatment can be prescribed. These cases usually die suddenly, from rupture of the capsule and escape of blood into the abdominal cavity. Prevention might be effected by not allowing old horses to get too fat.

IV. Cirrhosis, or Fibrous Degeneration.

This is due, probably, to material changes in the blood, which becoming poor in quality and scanty in quantity, gives rise to atrophy of the system, pining, and death. On post-mortem examination, the liver is found to be light, and in color of a yellow cast, roughened on the surface, firm to the touch, not so easily broken down as in a healthy condition; it is hard, fibrous and dry; and, when cut across, the lobules are replaced by white fibrous tissue, exhibiting a mottled appearance, like the interior of a nutmeg. No specific treatment is possible.

V. Jaundice, Icterus, or Yellows.

This is only a symptom of derangement of the liver, though commonly spoken of as a separate disease. It indicates an obstruction of the gall duct that conveys the bile into the intestines, the consequence of which is, that the bile is thrown back into the system, and hence the yellow appearance so characteristic of all liver disorders.

If it is not complicated with any other disease, give a purgative, No. 23, and follow it with No. 37. If, however, it exists as a complication, treat the other disease rather than this condition.

VI. Biliary Calculi, or Gall-stones.

Though gall-stones are rarely found, incrustations on the walls of the ducts are quite common. They do little or no harm, unless they accumulate to such an extent as to obstruct the duct, in which case there will be colicky pains, frequent looking around to the right side, and a yellow, bilious appearance generally.

Give No. 55.

VII. Hypertrophy of the Liver.

This, which is the name given an abnormal growth of the organ, is usually associated with a plethoric condition, resulting from idleness and high feeding.

Reduce the flesh, by giving No. 23, and restricting the diet.

VIII. Atrophy of the Liver.

This is a wasting, shrinking, pining away process. Its causes are either some other disease, or else starvation. If the former, treat the other disease, and the system may, perhaps, redevelop. If starvation and neglect are to blame, make a radical change, giving good food, and plenty of it.

IX. Softening, or Ramollissement, with Rupture.

This is probably due to repeated attacks of congestion and engorgement. The softening process goes on, till finally the inevitable sequel of rupture takes place. Sometimes the rupture does not involve Glisson's capsule, but only the glandular matter, and when this occurs, it will be manifested by colicky pains, and also by fainting fits, if the head is raised suddenly. The symptoms subside after a while, and appear to leave no injurious consequences. When, however, Glisson's capsule is ruptured, hemorrhage into the abdomen occurs, and a fatal termination suddenly ensues.

TEST FOR HEMORRHAGE FROM THE LIVER.

Prevention.—Recognizing that all affections of the liver leading to softening and rupture, are due to improper feeding, the methods of prevention are evident, viz: Regulate the diet carefully, reducing the quality of rich and specially nutritious foods, and giving more hay, straw, etc., and thus keeping down the tendency to undue obesity.

CHAPTER XVIII.

DISEASES OF THE EYE.

I. SPECIFIC OPHTHALMIA, OR MOON BLINDNESS.——II. SIMPLE OPHTHALMIA, OR CONJUNCTIVITIS.——III. AMAUROSIS, GUTTA SERENA, OR GLASS EYE.——IV. GLAUCOMA.——V. IRITIS.——VI. LEUCOMA.——VII. CATARACT.——VIII. FILARIA OCULI, OR WORM IN THE EYE.——IX. ENTROPIUM.——X. ECTROPIUM.——XI. TORN EYELIDS.——XII. CANCEROUS TUMOR IN THE EYE.——XIII. OBSTRUCTION OF THE LACHRYMAL DUCT.

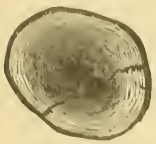
Diseases of the eye are not nearly as numerous among the equine race as in man, though it would be a mistake to infer from this that the eye is a less sensitive or complicated organ in the one than in the other. The ocular diseases of the horse are about all included in the list above given.

I. Specific Ophthalmia, or Moon Blindness.

This is the bane of horse-flesh in the West, where a multitude of good horses lose their sight from an hereditary disease that is utterly incurable, and runs on its certain course, fast or slow, to cataract. It consists of inflammation of the cornea, choroid coat, ciliary processes and iris, affecting, also, the humors and lens, and giving rise to an immense amount of pain on account of the intro-ocular pressure.

It is called *specific* on account of its occult cause, nature and periodicity. While it is transmissible to the offspring from either parent, it is especially so from the sire.

How to know it.—There is swelling of the whole eye, lids, conjunctiva, the mucous lining of the lids, and all internal parts of the eye; and the cornea being inelastic, the pressure and pain are intense. The eye is closed, or nearly so, from the light, tears run down over the cheek, and the mucous membranes become very red; and as a result of the inflammation, pus is formed in the anterior chamber, and may be seen as a whitish substance down in the lower portion.



SPECIFIC OPHTHALMIA.

Showing the closed pupil to keep out the light. The line shows the position of the haw.

After a few days, the inflammation subsides, goes away, and leaves the eye nearly as bright as natural; still, if examined carefully, shreds of the lymph will be seen hanging around in the anterior chamber, and the pupil will be ragged. After a period of from four weeks to three or four months, the trouble will recur with all the symptoms in an aggravated degree; the whitish substance (lymph) becomes purulent, and, settling at the bottom, may

there be seen like a half-moon. Examine the eye by the light of a candle, (the horse being in a dark place,) and the cornea will look dull, and the back of the eye bluish yellow. These appearances, accompanied by the recurrences from time to time, will plainly stamp the disease as specific or periodic ophthalmia. It may affect either eye alone, or both at the same time, and the periodic recurrence may either be noticed first in one and then in the other, or else always in the same one. After one or more recurrences, the lymph or pus in the bottom of the anterior chamber will remain. The pupil becomes uneven, the eye looks smaller, on account of its being drawn back into the socket to avoid the light, and before long, as a result of the inflammation, the fatty cushion at the back of the eye becomes absorbed. After a few recurrences, there is perceived a muddiness around the lens, which increases in opacity with each successive attack, till a cataract forms. This is the inevitable result. Then the intensity of the attack diminishes, and finally subsides altogether.

What to do.—There is no treatment known that will absolutely cure it; yet good attention will ward off the final termination for a long time. When first coming on, give a purgative, No. 23, and follow it up with this:

No. 79. 1 Drachm potassium iodide,
½ Pint water,
Mix.

Give this as one dose in a bran mash or from a bottle. Repeat it three times a day for a fortnight. Feed on bran mashes, green food, roots, etc. Bathe the eye with hot water an hour at a time, three times a day. Apply the following lotion to the eye, with a camel's hair brush, four or six times a day:

No. 80. 2 Grains sulphate of atropia,
1 Ounce water,
Mix.

Keep the animal in a dark place, with plenty of water to drink. When the active inflammation has subsided, use the following lotion:

No. 81. 5 Grains nitrate of silver,
1 Ounce water,
Mix.

Apply with a camel's hair brush, twice a day for a week or so, which will help to take up the cloudiness that may remain from the inflammation. If this object is not satisfactorily effected, apply No. 82.

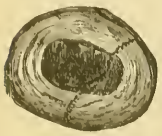
Prevention.—Never breed a mare affected with specific ophthalmia, not even when she is stone-blind and all danger of subsequent recurrences gone. Never breed to a stallion similarly affected. Its hereditary character is certain. It breaks out in the offspring, usually, between the ages of four and seven, most often at about six.

II. Simple Ophthalmia, or Conjunctivitis.

The lining of the eyelids is a sensitive, vascular, mucous membrane called the conjunctiva. Inflammation of this membrane and the other external parts is known as simple ophthalmia, or conjunctivitis.

Cause.—The most common cause is the introduction of foreign bodies into the eye, such as hay-seed, hair, cinders, lime or other caustic substances, etc. It often accompanies other diseases, as a symptom of fever, the conjunctiva at such times sharing with all other mucous membranes in the tendency to congestion.

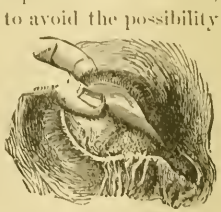
How to know it.—The eye is kept partly or nearly closed, the eyelids are swollen, the tears flow copiously down the cheek, and when the lids are opened the lining is very red and inflamed, with the haw drawn well up on the eye. After a day or two, the surface of the cornea (the transparent portion of the eyeball) becomes clouded with a whitish film-like substance, caused by the interrupted nutrition which attends the inflammation and tumefaction. If neglected, the opacity increases and soon becomes chronic, resisting treatment, and causing blindness. Sometimes, when the irritant is very severe, the inflammation extends to the interior of the eye, breaking down the structure of the parts, when blindness results, as a matter of course.



SIMPLE OPHTHALMIA.

The pupil natural, but the line showing the position of the haw, it being drawn well up on the eye, in its endeavor to brush off the foreign body.

What to do—Make a careful examination, and remove the offending object. Foreign bodies can be removed with forceps, or by a silk handkerchief passed over the head of a pin. The forceps should be curved, and the curved surface applied to the eye, so as to avoid the possibility of puncturing the points into it. If so much swollen that the foreign body cannot be discovered, the point where it is will be apt to be more swollen than the rest, thereby giving a clue as to its location. If it is down under the haw, the latter may be caught by a hook or tenaculum, and drawn up so as to allow complete examination of the surfaces beneath. It is often necessary to fasten the haw, to prevent its movements from interfering with the examination of the eye.



MANNER OF OPENING THE EYE WHEN SEARCHING FOR FOREIGN BODIES.

After the irritant is removed, bathe the eye with warm water having a small quantity of salt in it,—a teaspoonful of salt to a pint of water; have the water and sponge clean, and foment the eye half an hour at a time, three or four times a day. Insert a flaxseed under the lid several times a day, or smear across and into the eye the white of an egg.

If the cornea becomes cloudy, apply the following lotion morning and night, with a camel's hair brush.

No. 82. 10 Grains nitrate of silver,
1 Ounce water.
Mix.

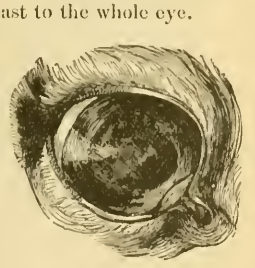
Apply lotion No. 80, six to eight times a day, with a camel's hair brush, all around under the eyelids and upon the eyeballs, to prevent the extension of the inflammation to the inner parts of the eye, or to alleviate it, if this has occurred. Give the animal rest, with soft feed and a dark stall.

III. Amaurosis, Gutta Serena, or Glass Eye.

This is blindness from paralysis of the optic nerve (the nerve of the sense of sight) and retina. The latter is the expansion of the optic nerve over the back of the chamber of the eye. There is no alteration in the structure of the eye, but simply loss of power to see. The pupil is greatly dilated, indicating the eye's insensibility to light, and has a very clear, bright appearance, like blue glass; and instead of contracting and expanding, as it should do, in different degrees of light, it remains fixed.

Cause.—It may depend upon injury to the brain, with effusion pressing on the optic nerve, and when this is the cause, the appearance of the eye above described will be noticed. Or it may result from excessive fever in any disease, and especially epizoötic influenza, if the temperature of the body runs above 106°. In the latter case, the retina is involved in the inflammation, loses its beautiful bluish lustre, and becomes whitish-green in color, and the humors (the liquids) of the eye get more or less muddy, and give a greenish cast to the whole eye.

As this condition may not be detected by a casual observer, by looking into the eye itself, it is necessary to notice closely the actions of the horse. It may effect one or both eyes. If only one, the horse's action may not be altered, but if both eyes are blind the fact will be betrayed by his high stepping and his constant moving of the ears forward and backward. These are indications which should always create suspicion in this respect.



EYE AFFECTED BY SERENA.

What to do.—Apply a blister, No. 9, to the cheek or temple, and on the back of the neck, and give internally Nos. 67 and 66 in alternation. But a cure is rarely to be hoped for.

IV. Glaucoma.

This is inflammation involving the whole globe of the eye, but more particularly the vitreous humor, (the fluid in the posterior chamber of the eye,) the iris, choroid, and sometime the retina. It occasions a dilated, irregular pupil, muddiness of the vitreous humor, and a sea-green color of the interior of the eye, with blindness as a frequent sequel.

What to do.—It is treated by constitutional remedies—calabar bean, electricity, etc., and also by iridectomy (an operation to excise a portion of the iris, to relieve the intro-ocular pressure.) These measures all require the skill of a veterinarian.

V. Iritis.

Inflammation of the iris (that portion of the eye forming the pupil and giving the color to the eye) is called iritis.

Cause.—Severe external violence, extremes of light and darkness, exposure to severe storms, facing the wind, and constitutional disorders.

How to know it.—A pink ring is seen around the sclerotica (the white, fibrous coat forming the large posterior portion of the eye); the eye is retracted and partly closed; the haw is drawn up; the conjunctiva is inflamed, there being considerable fever in the constitution; the pupil is very small, and the aqueous humor becomes turbid, with white flakes floating in the anterior chamber, and usually a little pus in the bottom of the latter.

MANNER OF SHADING A HORSE'S EYES WHEN SUFFERING FROM INFLAMMATION.

What to do.—Place the animal in a dark stall, or cover his face with a green cloth. Give a purgative, No. 23. Bathe the eye with warm water as much as possible, and apply No. 80 every few minutes for half an hour; then rest four or five hours, and repeat it. So continue from day to day, till all symptoms of inflammation are gone. Let the feed be soft and unstimulating.

VI. Leucoma.

This is a white opacity of the cornea, from extravasation of lymph into the fibres of the extension of the conjunctiva over the cornea. It may be the result of other eye diseases, of fever in the system, or of external violence. It is best treated by keeping in a dark place, with laxative food and continuous application of No. 82, till it is cleared up.

VII. Cataract.

As the most common termination of all inflammatory diseases of the eye, we see a white opaque substance covering the lens, and oftentimes completely filling the pupil. This is cataract, of which there are two kinds, distinguished by the terms capsular and lenticular, according to their position. Cataract is organized lymph attached to the lens.

How to know it.—Usually the pupil is very much dilated, and filled with the white lymph, the defect being so plain as to be seen a hundred feet away. Sometimes, however, it can only be detected by a close examination. Examine the horse, first, in strong sunlight, and note carefully the degree of contraction of the pupil; then place him in a dark stall, and examine the eye with a candle. A healthy eye reflects three candles, the first from the cornea, the second from the surface of the lens, the third from the back of the lens. When either or both of the last two are blurred or, worse, entirely wanting, you need no further proof of the existence of cataract.

What to do.—In recent cases, the eye may sometimes be cleared up by simply giving a purgative, No. 23, and applying a lotion, No. 82, at the same time giving No. 66, internally; but in later stages nothing could avail except to dissect them out—an operation that is never practiced on the horse for the reason that, without glasses, he would never be able to see things again, in their right position, size and form.

A FREQUENT RESULT OF IMPERFECT VISION.

Imperfect vision is worse than blindness, being vastly more misleading and wholly unreliable.

VIII. Filaria Oculi, or Worm in the Eye.

This is a small, thread-like worm, seen floating about in the aqueous humor in the anterior chamber of the eye. It is very rare. The worm

is from half an inch to two inches in length, and the size of a hair. It is white in color, and is very active, squirming about in the eye, apparently very much at home. It is probably taken into the stomach in the egg form, and after hatching, the mite works through the coats of the intestines and blood vessels, is carried by the circulation till it finds an agreeable medium, and there developes. It causes a great amount of inflammation and pain in the eye, in which it can be plainly seen by any observer.

What to do.—The only remedy is to puncture the cornea and evacuate the anterior chamber, when the worm will come out along with the other contents. This, however, is a delicate operation, and should never be attempted by any but a qualified veterinary surgeon. (See chapter on operations.)

IX. Entropium.

This is inversion of the eyelids, causing the lashes to turn in upon the eyeballs, and giving rise to an irritating disease called *Trichiosis*. It is due to excessive thickness of the lid above the rim, so that the rim is made to turn in.

What to do.—It is treated by cutting out an elliptical section of the skin, and sewing the wound up again, to shorten the lid. Let the long axis of the ellipse run lengthwise with the eyelid, horizontally.

X. Ectropium.

This trouble is consequent upon an inflamed and thickened conjunctiva. It is a turning out or eversion of the lids, showing their red mucous membranes continually. It is most common in the lower lid. It is treated by an operation to remove an elliptical section of the conjunctiva, the after treatment being the same as prescribed for simple ophthalmia.

XI. Torn Eyelids.

The lids are frequently torn by getting caught in hooks, nails, etc. When possible, sew them up at once. Bring the edges neatly together and sew them with fine silk, making fine stitches, and dress two or three times a day with lotion No. 39. Tie the horse in the center of a wide stall, with a line from each side, and let him eat off the floor, to prevent him from rubbing his head and tearing the laceration open again.

XII. Cancerous Tumors in the Eye.

These, though rare, are occasionally met with in the horse, and their only treatment is to extirpate them by cutting out the eye. Cancerous growths are always malignant, and spread to surrounding tissues. (See chapter on operations.)

XIII. Obstruction of the Lachrymal Duct.

This duct is the one that carries off tears and superfluous moisture from the eyes to the nose. It runs from the inner corner of the eyelids to within two or three inches of the nostril, and empties on the floor of the nasal passage. It occasionally becomes stopped up from extension to it of the inflammation attending catarrh, and then the tears, having no other channel of escape, may be seen flowing down over the cheek.

OBSTRUCTION OF LACHRYMAL DUCT.

What to do.—See if there is any mechanical obstruction in the nose, and, if so, remove it; if not, swab out the nostril with an infusion of tobacco. Should this fail, the duct must be opened with a probe. Take a fine elastic probe, about the size of a knitting needle, and a foot long, and insert it once a day for several days, and inject No. 73 with a fine syringe.

CHAPTER XIX.

PARASITIC DISEASES OF THE HORSE.

I. INTESTINAL WORMS.——II. BOTS.——III. LICE.——IV. MANGE.——V. RINGWORM.

I. Intestinal Worms.

Three kinds of tape-worms and seven of round worms have been found in the intestines of the horse. The tape-worms are very rare, and hence have but little interest for the average reader. But the round worms are both very common and highly injurious to the animal harboring them.

Pin-worms or ascarides.—The most noteworthy is the pin-worm, of which two kinds are very common, viz: *Sclerostomum Equinum and Oxyuris curvula*. These, which are usually spoken of as *ascarides*, are small round worms about an inch and a half to two inches long, pointed

A FRUITFUL MEDIUM FOR THE SPREAD OF MANGE.

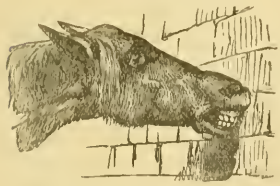
at both ends, with a small black head. They inhabit the large intestines (the rectum usually, and sometimes the colon,) where they often exist in large numbers, some of them being passed, also, from time to time, in the dung.

Teres Lumbrici.—The next most common worm is the large round worm scientifically known as *teres lumbrici*, which are about as thick as a clay pipe-stem, and, as to length, about eight to twelve inches for the male and about ten to eighteen inches for the female. They infest the

small intestines, and frequently enter the stomach, but from the fact that they seldom exist in very large quantities, commonly do somewhat less damage than the *ascarides*. Nevertheless, the writer has occasionally seen them come away by the hat-full, after a heavy dose of vermifuge.

How to detect their presence.—When in small numbers, their existence is hardly ascertainable, but when in large numbers, their presence will be betrayed by a capricious appetite, usually a ravenous one; emaciation, with dry, coarse, staring coat, and a pot-belly; a whitish-yellow mould will be seen around the anus, probably made by worms being crushed while passing out, leaving their contents sticking to the skin, and, usually, more or less of the worms will be seen in the dung. When they get into the stomach, the horse will turn up his upper lip, as if nauseated, and will also rub his lips against the wall, manger, etc.; he will lick the wall, sometimes even lick the hair off himself, and will persistently rub his tail or keep switching it around, and otherwise manifesting the irritation that exists in the anus and rectum.

APPEARANCE OF COLT SUFFERING FROM WORMS.



HORSE RUBBING HIS NOSE AGAINST A WALL—A SYMPTOM OF WORMS.

Giant Strongle.—Another round worm occasionally observed in the horse, is the giant strongle, (*Eustrongylus Gigas*,) found, most commonly, in the kidneys and bladder. But sometimes, after having completely devoured a kidney, this rapacious parasite bursts the capsule, and falling into the abdominal cavity, there floats about among the intestines. It then causes peritonitis and death. These worms are as large as a man's big finger, and from one to three feet long. Their color is a bright pink.

What to do for worms.—There are numerous useful vermifuges. The most convenient and effectual is the following:

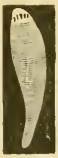
No. 83. 1 Drachm sulphate of Iron,
1 Drachm tartar emetic,
2 Drachms linseed meal,
Mix.

Give as one dose, repeating it morning and night for a week; then give a purgative of oil and turpentine, as follows:

No. 84. 1 Ounce spirits of turpentine,
1 Pint raw linseed oil,
Mix.

Give as one dose.

After three weeks, repeat the entire treatment, to catch the young worms previously left in the bowels, in the form of nits or eggs, and which have hatched since.



PEUTASTOMA TŒNOIDES.

Acarus which lives in the nose.

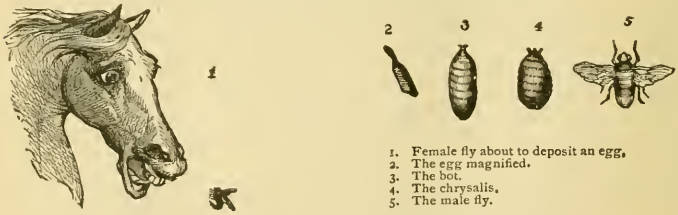
Nasal and bronchial acari.—One sort of acarus is found in the nose of the horse, and another, the *strongylus micrurus*, in the bronchial tubes. They are from one and a half to three inches long.

II. Bots.

The *œstrus equi*, or horse gadfly, in laying its eggs, attaches them to the hair of the horse, usually on the fore legs and breast, so as to be convenient to the horse's mouth. The horse licks the spot irritated by the fly and thus gets one or more eggs into his mouth; it is hatched by the heat and moisture, passes down the gullet, and attaches itself to the coat of the stomach by two little hooklets on the head, and there hangs for several months, as yet not having the power to let go. This is one of the stages it has to go through, to become a fly. When it has matured, it lets go, and soon passes out with the dung. It then hides itself in the earth, to undergo another change, and after six or seven weeks' growth, in the pupa condition, emerges a full fledged gadfly, capable of annoying many horses and propagating its species indefinitely.

THE GADFLY.

A BOT.



1. Female fly about to deposit an egg.
2. The egg magnified.
3. The bot.
4. The chrysalis.
5. The male fly.

THE GADFLY, AT VARIOUS STAGES OF DEVELOPMENT.

The bot sucks liquid nourishment from the food of the horse, and

never, as is popularly supposed, eats the stomach; for the holes found in the stomach soon after the death of a healthy animal, are really caused by the action of the gastric juice,—in fact, a kind of self-digestion by the stomach itself.

BOTS FASTENED TO THE STOMACH, UNABLE TO LET GO.

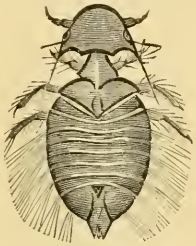
The only harm bots can do is to accumulate in such large quantities in the stomach and bowels as to interfere with digestion and the free passage of the fæces. In such cases a purgative may prove advantageous.

No specific treatment is necessary. Feed well.

III. Lice.

All animals suffer from the ravages of external parasites, the most common of which are lice. They are wingless insects, divided into two classes, *blood-suckers* (*Hæmatopinus*) *and Bird-lice* (*trichodectes.*)

HEN-LOUSE, OR DERMANYSSUS OF THE HORSE.



GONIODES STYLIFER OF THE TURKEY.

The former have narrow heads and long, trunk-like sucking tubes; the latter, very broad heads and biting jaws, but no sucking tube. Lice always impoverish the animal they infest, causing loss of flesh and general unthriftiness. Our four cuts of them are, of course, greatly magnified.

What to do.—The safest and most effectual remedy is a tobacco infusion, made as follows:

No. 85. 2 Pounds tobacco,
3 Gallons water.
Mix, and steep for two hours.

Sponge the animal thoroughly. Or the following may be used in the same manner:

No. 86. 3 Pounds quassia chips,
1 Gallon water,
Mix, and steep one hour.

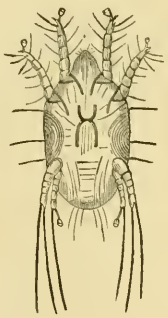
IV. Mange.

HÆMATOPINUS, OR BLOOD-SUCKING LOUSE OF THE HORSE AND ASS.

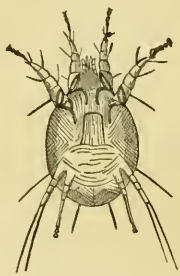
This is a parasitic disease that is due to a class of insects called *acari*, of which there are three kinds that trouble the horse, viz: the *sarcoptes*, *dermatophagus and dermatocoptis*. The first named burrows in the deeper layers and cracks of the skin, while the last two live on the surface, under the scabs, where, of course, they are more easily got at than the former, and hence are less difficult to treat.

TRICHODECTES OR BIRD-LOUSE OF THE HORSE.

How to know it.—There is a terrible itching that cannot be satisfied; the more the horse rubs, the more he itches. Horses with the mange will sometimes be found turned out to pasture, and rubbing and scratching against posts, trees, fences, etc., or even against one another. As



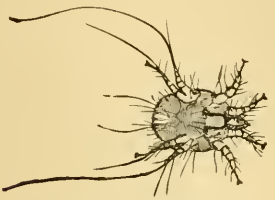
DERMATOPHAGUS EQUI.



DERMATOCOPTES EQUI.

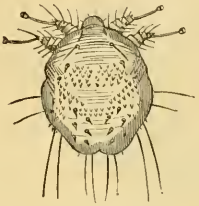
the mites possess great vitality, and will live a long time away from a horse, those left on the posts, etc., will infest any other horse coming in contact with it weeks, or even months, afterward. Mange is contagious by actual contact. The skin gets rough and scaly; the hair comes off in patches; the skin gets pimply, and when rubbed much, gets quite raw. It usually affects the head and neck first, sometimes spreading so as to take the hair entirely off. Its spread is quite rapid, and keeps the horse in agony all the time. He will push against your hand, in evident

pleasure, when you scratch the affected part; and this constitutes a good test for mange. (See cut below.)



MANGE MITE (MAGNIFIED.)

As given by Doctor Erasmus Wilson.



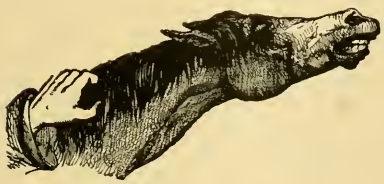
SARCOPTES EQUI.

What to do.—Wash the parts affected with hot water and strong soap, to remove all scabs and scurf; then, when dry, rub well in to all affected spots the following mixture:

No. 87.
4 Ounces sulphur.
2 Ounces oil of tar.
½ Pint linseed oil.
Mix.

V. Ringworm.

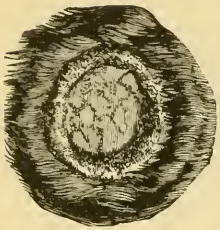
This is a fungous, vegetable parasitic growth, scientifically known as *tricophyton tonsurans*. It is contagious, and attacks all classes of animals, yet sometimes arises spontaneously from poverty and filth. It manifests itself by a round bald spot, scaly and elevated inside the ring, which is red and inflamed. It begins in a small pimple-like sore, which spreads very fast, increasing in size from day to day, and new sores forming on other parts of the body. The ring is surrounded by a row of broken, bristly hairs, which split, and become filled with spores of the fungus; and as fast as one row of hairs is disposed of another row is attacked.



TEST FOR MANGE.

Ringworm is, at first, simply a disfigurement, but it should, on no account, be neglected. If allowed to run on, it becomes very troublesome. The scurfy skin of ringworm is easy of recognition, the particles of scurf coming off in little flakes or scales, which have been aptly compared to the coarser, husky portions of bran.

There is another form of ringworm called *favus*. It shows the same general appearance as the other, except that a scab forms in the center, after the ring has receded.



RINGWORM.

What to do.—Wash with soap and water; when dry, paint with tincture of iodine or the following:

No. 88. 40 Grains corrosive sublimate,
1 Pint water,
Mix.

Repeat once a day till cured.

CHAPTER XX.

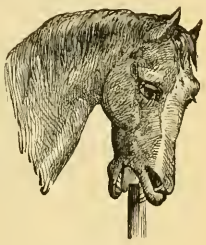
VICES IN THE STABLE.

I. CRIBBING.——II. WIND SUCKING.———III. GNAWING THE MANGER, CLOTHING, ETC.——IV. KICKING WHILE EATING GRAIN.——V. WASTING THE GRAIN.——VI. PULLING BACK, AND BREAKING THE HALTER.——VII. BALKING.

Horses frequently contract pernicious habits in the stable, such as always prove very annoying and often incurable. Nevertheless, a little ingenuity will sometimes work wonders, not only in preventing the formation of such habits, but also in breaking them up. The most common stable vices are those above noted.

I. Cribbing.

This is a habit of catching hold of the manger, post, fence, or other object in front of the horse, with the teeth, and bearing down till the neck is altered in position, so as to form a temporary vacuum in the pharynx, when the air rushes in to fill it, making a sound not unlike the hiccough. It frequently occurs that the horse will devote nine-tenths of his time to cribbing, to the neglect of eating and sleeping, especially if at grass, and bringing on indigestion, emaciation and hidebound. For this reason, cribbers are usually thin in flesh.



CRIBBING.

Cause.—Cribbing is considered by some to be the result of indigestion; by others, of pain in the teeth while teething; and by others still, of idleness. While there are cases that undoubtedly seem traceable to the first two mentioned causes, the writer thinks this habit will be found, uniformly, to be associated, at least, with idleness. Old horses sometimes take it up, and horses of all ages are apt to do so, if tied beside a cribber; but in every such case idleness seems to be a prerequisite. This opinion is strengthened, too, by the undeniable fact that a horse kept in the stable several weeks, from some trivial cause, is especially apt to acquire it.

What to do.—There are many devices in vogue for the cure of cribbing, each containing more or less merit,—such as a piece of buffalo robe, or of iron, nailed on the edge of the manger; red pepper smeared over the latter; a small strap around the throat, drawn very tight, etc. But the most effectual plan is to tie him in a wide stall, with a line from

each side, to keep him in the center, and feed him on the floor, Some horses, however, will crib lying down; or, if tied too short to reach the floor, will sometimes crib on their own knees. The writer saw a horse tied in front of the Board of Trade Building, in Chicago, that was checked up so short that he could not reach the flag sidewalk: so he would put one foot up on the walk and crib on his knee, which he was just able to reach. He would stand there, and do this by the hour. Cases so inveterate are not curable. Give internally, as treatment for the stomach, the following:—

No. 89.
2 Ounces bicarbonate of soda,
1 Ounce gentian root, powdered,
2 Ounces linseed meal,
Mix.

Give a tablespoonful morning and night, in soft food, and give plenty of exercise. Old, long standing cases are obstinate, but those more recent may generally be cured by the above treatment, if persevered in.

Prevention.—Avoid long-continued idleness, and also overfeeding on strong, heating grain. A horse, to be kept in health, should be exercised every day, and fed according to the work performed.

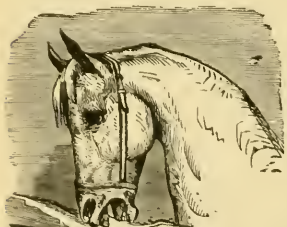
II. Wind-sucking.

This is similar to cribbing, which it often accompanies, but the horse may suck wind without cribbing. He arches his back, curves his neck, draws in his chin towards his breast and down goes a swallow of air into the stomach; this continues, usually, till he is so bloated that he is like a barrel, and cannot hold any more. It is injurious, as being apt to cause indigestion, colic, emaciation, hide-bound, etc.

Give No. 89 in soft food. This may help the case; still, wind-suckers are generally incurables.

III. Gnawing the Manger, Clothing, etc.

This habit, and especially gnawing the manger, is formed in idleness, or else indicates the want of salt. Tearing the blankets sometimes comes simply from being too warm, especially if the horse is fat; the skin gets hot and itchy, and he would be more comfortable without a blanket, and perhaps should have medical treatment, constitutionally.



GNAWING THE MANGER.

What to do.—Give him plenty of work, and feed accordingly. If he persists in the habit, smear the manger with assafœtida, or make it of iron. If a blanket is really necessary, he can be prevented from tearing it, by tying a stick from his cheek to the surcingle.

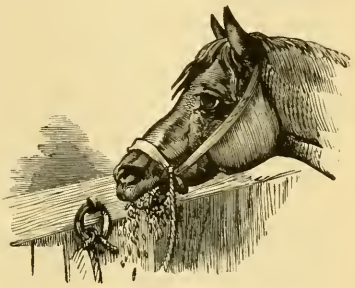
IV. Kicking while Eating Grain.

This is another outgrowth of continued idleness, in connection with a nervous disposition. The horse, while eating his grain, will kick the side of the stall, sometimes as often as four or five times a minute. This he usually does with one foot, but sometimes with both,—first one and then the other.

What to do.—A piece of chain, a foot or so in length and tied to the pastern of the foot used, will sometimes prove effectual. Another plan which usually answers the purpose, is to run a small rope from the bit through a collar and surcingle to the foot. Or, a small bit may be used, —one that will not interfere with the eating. Whipping is useless.

V. Wasting the Grain.

This is a playful habit of taking up the grain into the mouth and sifting it out again, throwing it around much as a child would the bread and butter of which he had too much. As a rule, it shows that the horse has too much grain and too little exercise; he is fed more than he needs or can relish. A horse will not do it till he is fat and cloyed, except, perhaps, in occasional instances of irregular or decayed teeth. Treatment for these exceptional cases is given in the article on teeth.



PLAYING WITH THE GRAIN.

What to do.—The treatment consists in removing the cause: give more work and less grain. Sometimes a hard-worked, ravenous horse will plunge his nose into a mess of oats and throw half of them out, from sheer irritability of temper. Treat him kindly, however; place a large angular stone, the size of a man's double fist, in the center of the manger, and put the oats in with it, which will compel him to go about the matter more leisurely, and prevent him from throwing the grain out.

VI. Pulling Back, and Breaking the Halter.

This very bad habit commonly originates from the horse getting frightened, when, jumping suddenly back, he breaks the halter; and as average horse sense knows that a thing once done can be done again, the jerk is repeated, in sportiveness or mischief, till it becomes a confirmed vice.

What to do.—Have a very strong halter, and tie high on the manger, which will give the horse less power to pull than when tied low. Some

recommend a small rope, passed under the tail and tied to the manger, which may act well in some cases. But the main point lies in so fastening him that he cannot get away, when, after a few ineffectual attempts, he will give it up.

In halter breaking a colt, pass a rope behind him, so that he cannot pull full strength on the halter, and be very sure nothing is used with him that will break; one accident of that kind may be enough to start a persistent bad habit.

VII. Balking.

This, though not strictly a stable vice, is so nearly allied thereto that it seems quite proper to treat of it in this connection. The best way to break a horse of balking is not to be in a hurry, but, rather, to let him stand to his heart's content; avoid hitching him to any load he cannot pull easily; coax him and pat him; feed him apples, salt, sugar, etc., out of your hand. Let the same man always handle him, if possible; a change of drivers might spoil all that has been accomplished. If there is no time to wait for him, hitch another team ahead of him and snake him along. The chain, or even rope, passed around his neck for the other team to pull by, is very effectual. Try and divert his attention by offering a handful of salt or oats; or, even a handful of earth may serve every purpose.

The maxim always to be observed in all of these cases is: Treat the horse with kindness. A balky horse cured by kindness, an achievement not only possible but absolutely feasible, is the best, toughest, most persevering creature in existence, from the fact that only horses possessed of a great amount of spirit and determination ever get balky, those that resent and resist abuse. It is abuse, generally speaking, that makes a horse learn to balk,—such foolish and barbarous work as getting into a hole with a heavy load, and then whipping unmercifully, to try and make the poor dumb victims perform impossibilities. Let the reader set it down as an axiom, that kindness is always repaid by faithful service.

CHAPTER XXI.

CONSTRUCTION AND MANAGEMENT OF STABLES, AS RELATED TO HYGIENE.

I. NECESSITY FOR STABLES.——II. CONSTRUCTION OF STABLES.——III. FEEDING AND WATERING STOCK.——IV. THE CARE OF STOCK WHEN IN STABLE.——V. ADDITIONAL DIRECTIONS FOR GIVING MEDICINES.——VI. DETECTION OF DISEASE.

I. Necessity for Stables.

In many regions and climates, stables are not necessary; horses, mules, cattle and all kinds of stock lie down to rest and sleep in the open air, under cover of the blue sky, or, if they have any shelter, they find it for themselves, in groves, edges of forests and canons. In some countries yards or corrals are made, and the stock driven into them at night, to keep them from straying, and from being attacked by wild beasts.

In this country, and especially in the northern and central States, stables are indispensable, as a protection from cold, sudden changes and severe storms. They are tokens of civilization and Christianity, the result of a humane disposition to provide comfortable—sometimes even luxurious—quarters for the animal dependents as well as for the family.

II. Construction of Stables.

The construction of the stable, in all its various features, including the arrangements for its drainage and ventilation, as well as stalls, mangers, etc., is of great importance, as bearing directly upon the health, as well as the comfort, of the animals. Mistakes in stable construction are often the unsuspected cause of lameness, of disease, and even death. Hygienic considerations should, therefore, have their full weight in planning and building a barn.

Location is the first consideration, as determining the possibilities of good drainage. Do not build a barn in a hollow, with rising ground all around it; for this would expose your stock to miasmatic fevers and other derangements of the general organism. In such a location, the simplest attacks of disease would be likely to take on a serious type, with greatly increased uncertainty in the action of remedial agents. Build a stable on an elevation, if possible. Have ground around it, at least on one side, that slopes away, so as to furnish good natural drainage, or free escape for surperfluous water.

The next point after settling that of location, is the artificial drainage. There should be one large drain, to act as the discharge, with several

smaller ones extending in every direction, to act as feeders thereto; also, outlets to the several parts and corners of the stable. See that there is descent enough to have a rapid flow of the sewage.

The next point to be attended to is to build the shell or walls so as to secure light enough. Right here is the chief defect in most city stables. Nothing is so weakening to the eyes as to be kept continuously in a dark place. When a horse thus stabled goes out into the glaring sunshine, the eyes cannot immediately adapt themselves to the new order of things, and see objects dimly, uncertainly, and with a squint, and hence he is apt to shy and otherwise misbehave. But this is not the only injurious consequence. It is a frequent cause of congestion of some of the inner sensitive parts of the eye, leading on to inflammation, and perhaps to blindness. If a small window is made at the head of each horse, it should be placed at least two feet above his head, so as not to have the light shining directly into his eyes; but the best arrangement is to have the whole place lighted with a diffused light.

Next, as to the stalls. Let the plan always include one or more box stalls, in which to place a sick or lame horse, as it is downright cruelty to confine a sick horse. Have the box stall so constructed that it can be darkened at will, as without this you could not properly care for a horse suffering with eye disease. Let the box stalls have a level floor, as it is not only fatiguing but absolutely injurious to the joints of the feet and legs to stand on a sloping floor. The boxes should not be less than ten feet square.

POINTS OF THE LEG.

Showing the location of synovial membranes and joint oil.

The common stalls should be from four to five feet wide, remembering that five is preferable to four; for horses are apt to get cast in narrow stalls, and, besides, they have less comfort when lying down. The floor of the stalls should slope a little, just enough to have the urine drain off, that is, from one to two inches, one inch being preferable. There is nothing more injurious to the tendons, legs and feet than floors built, as many are, to slope from five to eight inches.

INJURED TENDONS.

The result of sloping floors.

Four cuts are here given, showing the anatomy of the parts that sustain injury in this way, and the results commonly seen following such injuries. The center of gravity is thrown in a different line from what nature intended; and though the feet and legs can stand this for a while, yet when long continued, the tendons become wearied, from the constant strain, and are also predisposed to sprains when the horse is taken out. The joints, too, share in the protest against the slope. The weight being thrown upon a bearing that is unnatural, the cartilages and ends of the bones become irritated, and the synovial bursæ distended; inflammation is set up; and then follows ringbone, spavin, osteophytes, or the like trouble, according to the special susceptibility of the animal.

Any one may satisfy himself as to the correctness of these views, by noticing how a horse will back out of his stall, and stand with his toes in the gutter, back of him. What is this for? To rest the back tendons that have been under an unnatural strain. Horses, when left to choose for themselves, will almost invariably find a place where the hind feet stand higher than the fore. This is well illustrated by the cut at the end of chapter IV, Part II.

OSTEOPHYTES ON THE PASTERN BONES.

DISEASED HOCK JOINT.

Another danger from sloping floors. Hock joint of the left hind leg, in which the bony deposit of spavin has involved all but the true hock joint.

The stall should be built, as to length, to suit the class of horse intended to occupy it. Draft horses, for instance, require longer stalls than buggy horses. Make a gutter just back of the horse, to carry off the urine, and let the floor beyond the gutter be on the same level as the floor of the stall. Some stables have the stall floor built from three to ten inches higher than the main floor. This is a great mistake, notwithstanding it may save labor to the stable-man, for his comfort and ease should never be allowed to outweigh those of the stock.

Very serious accidents sometimes happen from the horse kicking over the rear post of the stall, and coming down astraddle of it, in some instances letting the intestines right out on the floor, and in others skinning the whole inside of the leg, from the thigh to the foot, clean to the bone. To prevent this, let the rear post go from floor to ceiling, and see that it

is securely fastened there. Build the insides of the stalls of hard wood planks, to the height of four feet, and top them out three feet more with strong wire-work, which is decidedly preferable to a solid partition between the stalls, as it affords their inmates the comfort of one another's society. Horses, like human beings, get lonesome when isolated, and pine for company; besides this, solitude has a tendency to engender viciousness.

Ventilation is a very important matter, as every one will admit who has gone into a badly ventilated stable in the morning, and noticed how

THE LAZY MAN'S WAY OF CLEANING THE LEGS.

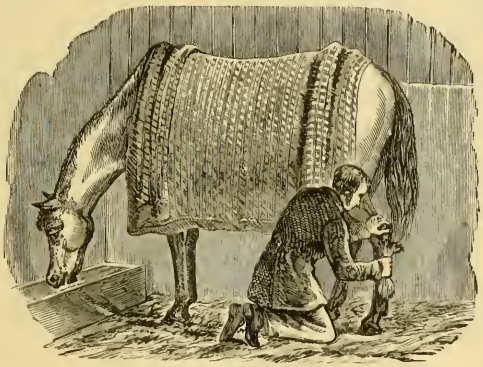
Easy and convenient, but very injurious.

it affects his eyes, his breathing, etc. Large tubes should be placed along through the stable, from thirty to forty feet apart. They should be from two to four feet square, and run out through the roof, with slats at the top or sides for water-sheds; below, they should come just through the ceiling into the stable. Then, every twenty feet, there should be tubes, four or five inches square, entering at the floor, through the walls, from the outside, and carried up along the wall inside as high as eight feet. The air thus admitted, making a curve at the top of the tube, will descend to the floor, but becoming tempered before it strikes the horses, and will force up the warm, vitiated air through the large tubes and out through

the roof. As to doors, have enough to keep the stable cool in summer, but avoid a draft, especially when the horses come in warm and tired, as they are then especially susceptible to colds, and attacks of throat and lung diseases, etc.

III. Feeding and Watering Stock.

This is a matter that interests every stock owner, and one also in which there is a great amount of abuse. We seldom find a duplicate of the notorious bad-debt collector, Cottle, of Chicago, who deliberately starved his horse to death, but we often find men who abuse their stock through ignorance. For instance, there are not a few who water their horses only twice a day. This is a real abuse, for not only does the animal get terribly thirsty, but, as a consequence of his intense craving for water, he will, when he at last gets at it, drink a great deal more than is good for



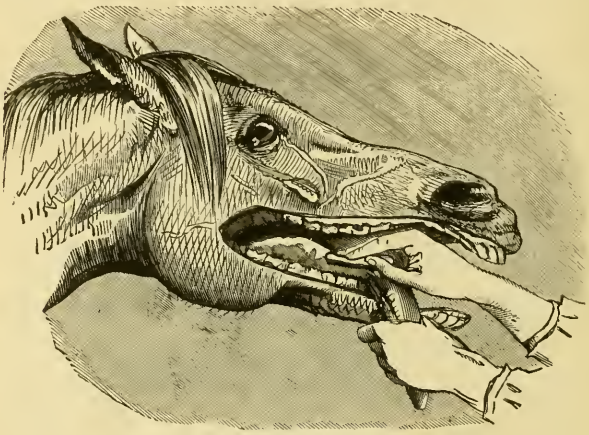
THE PROPER WAY.

How to dry and clean the legs in cold weather.

him. The stomach of a horse holds only about three gallons, but in these cases he will sometimes drink three or four pailfulls, making from nine to twelve gallons. If this follows soon after eating, it washes the food right through the stomach into the intestines, before it is digested, giving rise to colic, with all its attendant dangers. The water given stock should always be clean, not from a foul well in the barn-yard, and should be allowed three or four times a day, preferably four; or, better still, let it run before them all the time, being careful not to let them over-drink when coming in warm from work.

The food should be clean, sound, dry, healthy grain and hay, and well harvested, free from smut. It is a great saving to the pocket of the

owner, as well as to the stomach of the horse, to grind all grain and cut the hay; and it is an unquestionable advantage to the animal to have the grain partly cooked, by steaming. This can be effected, without much trouble, by pouring hot water on it, covering, and then letting it steam and swell. This will render the grain more digestible, and less liable to ferment and cause flatulent colic; more of it will be digested, also, because the cooking will make digestible a considerable proportion of the food



THE OLD WAY OF GIVING A BALL.

In which the operator is liable to get his hand scratched or bitten, and the horse's tongue may be torn.

that in its natural state is not so: hence the economy. Stock of all kinds should be fed three times a day—less at a time if necessary, but never at greater intervals.

The quantity of food must always be ganged by the size of the animal and amount of work exacted. Work horses accustomed to large feeds of strong grain should have it reduced when idle, even for the short time extending over Sunday. They should get simply a bran mash or a mess of carrots on Saturday night, and the other feeds should be reduced nearly one half on Sunday: then they will come out in fine condition on Monday morning. But if the usual quantity of strong, heating grain is allowed, the horse is very apt to come out Monday morning with a big elephant leg—lymphangitis, or else, though going out apparently all right, is soon attacked with congestion of the kidneys or other internal organs.

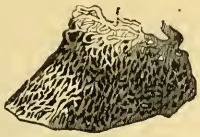
IV. The Care of Stock when in Stable.

The object of this section is more to correct abuses in the us of cold water and want of exercise than to give elaborate rules in regard to grooming, etc. Cold water is a good thing, but, like all good things, is apt to be abused. In our northern latitudes it is too cold to allow the free use of cold water in cleaning the horse's legs and feet, from November 1st to April 1st, or even a longer period; for cold water thus used on the extremities already chilled, is very apt—nay, almost certain—to cause scratches, grease, furrmele, or the like. If warm water is used and the legs thoroughly dried, no damage is done, but it is not once in a hundred times that they are thus properly dried. The best way is to clean and dry the legs and feet with a whisk of hay or straw, or with a rubbing cloth when the horse comes in; then, when thoroughly dry, clean them properly with a brush. This, in most instances, will keep the legs free from scratches.

SCRATCHES.

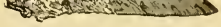
As seen in the hollow of the pastern.

Horses should not be kept any considerable length of time on a board floor without exercise and occasional removal of the shoes, the same as though he were at work; for the feet will get dry and brittle, contract and



SHOWING THE VEINS OF THE FOOT.

Which may be seriously interfered with by contraction of the hoof from standing too long on a board floor without attention to the moisture, shoeing, etc., of the feet.



EXOSTOSIS OF THE COFFIN BONE.

As sometimes seen in complications of navicular disease, contraction, side bones, etc.

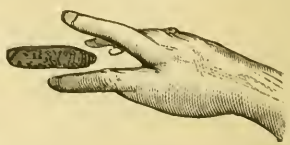
press upon the quarters, causing corns, and perhaps setting up inflammation that may form side bones, contract the tendons, etc. If obliged to keep a horse standing idle in a stable, have his shoes taken off, and, if possible, let him have a dirt floor to stand on, sprinkling occasionally to dampen it. A box stall would be much the best for him.

V. Additional Directions for Giving Medicines.

It is very necessary for the stable-man to be able to give medicine, both in the form of drenches and balls. Many a dose of medicine, of the

utmost value to the horse, is lost through not knowing how to administer it properly. Small doses of liquids are best given with a syringe. Stand in front of the patient, fill the syringe, (one that can be worked with one hand is absolutely necessary), open the mouth by inserting the left hand through the mouth, and holding the fingers up on edge; pass the syringe between the fingers, and shoot away; withdraw the syringe, and elevate the head a trifle with the left hand. So continue till the dose is all down. When properly done, not a drop is wasted and the horse is not excited; nor (which is quite a point) does the man get angry, and whack the horse over the head with the bottle. With large doses, however, the bottle must be resorted to. Pass a loop in the mouth so as to catch the upper jaw, then raise the head by running a line over a pulley, or by inserting a long crotch or fork in the loop and having an assistant lift at it; the operator, meanwhile standing at the right side of the horse's head, steadies the head with one hand, and pours down the contents of the bottle with the other. Pour very slowly, and never resort to any violence to make the patient swallow; just give him his time. If he coughs, strangles or chokes, let down his head instantly, regardless of the loss of the medicine. (See last cut in Chapter I, Part II.)

Solid medicine it is best to give in the form of a ball. Make up the ball with syrup, soft soap or linseed meal, its size that of your big finger, and wrap it in soft paper; stand in front of the horse, catch firm hold of the tongue with the left hand, and draw it down between the incisor teeth, never at one side; take the ball between the fingers, the thumb being drawn into the palm of the hand; then pass it back, placing it on the root of the tongue, let go of it, and give it another push with one finger; withdraw the hand, let go the tongue, close the mouth, elevate the head a trifle, and watch on the left side of the neck for it to go down. Remember, in giving medicine of all kinds, never abuse or excite the patient, but take him as quietly as possible.



THE PROPER WAY TO GIVE A BALL.

For the benefit of young farmers and others of limited experience, we would say that good sense and self-possession are the secrets of success in treating sick stock. These will greatly aid you to see clearly what ought to be done, and to use to the best advantage such means as you have at hand for doing it.

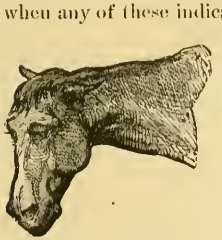
There are cases in which medicine and food have to be administered in some other than the ordinay way; as, for instance, to a horse with tetanus, that cannot open its mouth. In this case, the medicine and

liquid food can be given through a tube passed through one of the nostrils and down into the throat, or they may be given by the rectum; but in the latter case large quantities will be necessary, as a portion will not be absorbed.

FEEDING A HORSE WITH TETANUS.

VI. Detection of Disease.

It is of the greatest importance that every stableman should have a quick eye for the early symptoms of disease in his stock. Ignorance of these symptoms allows the case to run on into a more advanced stage, when its treatment requires more skill, and more medicine, all entailing more expense in order to save it, and, of course, with much less chance of doing so after all. "A stitch in time saves nine;" and no one will dispute the fact that it pays to spend ten dollars to save a hundred. If it pays to treat an animal at all, in pays to begin doing it early. One day's neglect of a sick horse may cost his life. When, therefore, a horse stands back in his stall, hangs his head, drops his ears, refuses his feed, declines to move, partly closes his eyes, has the nostrils slightly dilated from increased frequency of respiration, or has the ears and extremities cool or cold,—when any of these indications are noted, it is safe to conclude that the horse is sick, and something should be done immediately. If near a qualified veterinary surgeon, employ him; otherwise, endeavor to find out for yourself, and at once, what is the matter. Note the symptoms carefully, taking the pulse, respirations and temperature, and examining all parts; then, when the disease is diagnosed, proceed with the treatment vigorously. There are many simple ailments that any intelligent man can cope with successfully. Get at the bottom of the trouble, remove the cause, apply the treatment, and, in most cases, you can cure the animal. Take, for instance a case of aphtha, which is a simple irritation of the mouth, tongue and lips, sometimes extending up to the cheeks, both inside and out.



A SICK HORSE.

Appearances about the head that indicate a sick horse.

Aphtha is much the oftenest seen in foals, resulting from the irritation to the membranes of the cheeks that follows too much sucking. When

seen in older horses, its most common cause is the irritating effects of the dew and frosted grass in spring and fall. The lips, tongue, etc., will be found to be slightly swollen, and covered with a pimply eruption resembling blisters; in fact, the parts affected look as though blisters had actually been applied.

APHTHA.

The treatment, in the case of a foal, is simply to separate him from the dam for a few hours; let him suckle, and then promptly separate them again, and so on till he is well. Older horses should be taken up nights, and not let out in the morning till about nine o'clock. Swab out the mouth and affected parts with recipe No. 46.

This is all very simple, and nothing at all but what any stock man could do, if he would give the case proper thought and attention.

CHAPTER XXII.

OPERATIONS.

I. ANÆSTHETICS, AND HOW TO USE THEM.——II. BANDAGES.——III. BLEEDING.——IV. BLISTERING.——V. CASTING.——VI. CASTRATION.——VII. EXTIRPATION OF THE EYE.——VIII. FIRING.——IX. LITHOTOMY.——X. LITHOTRITY.——XI. NEUROTOMY.——XII. NICKING AND DOCKING.——XIII. OPENING AN ABSCESS.——XIV. TAPPING THE CHEST, AND TAPPING THE ABDOMEN.——XV. PRICKING.——XVI. PROBING AND OPENING A FISTULA.——XVII. SPAYING.——XVIII. SUTURES.——XIX. TAPPING THE BELLY FOR FLATULENCE.—— XX. TENOTOMY.——XXI. TRACHEOTOMY.

In this chapter we shall describe all of the more common surgical operations on the horse. Some of these can be performed by any intelligent person, who will exercise a reasonable amount of care and prudence, with ready reserve resource to fall back on in case of accident. The latter, in fact, is a very necessary qualification in any operator; for accidents may happen, and result disastrously, in the most skillful hands. At the same time, many valuable expedients may be resorted to, in cases of this kind, which it is absolutely impossible to prescribe by set rules beforehand. Here, quick-witted common sense must be the main reliance of all practitioners alike.

I. Anæsthetics, and How to Use Them.

Anæsthetics are drugs or agents that destroy feeling. They take away all sensation, and all power of voluntary action; and they sometimes cause death, by suffocation, or suspension of the involuntary actions of the body, if they are given too fast, or their use is carried too far. Hence, they should never be administered by inexperienced or unskillful hands. The principal agents of this class employed in veterinary practice are chloroform and sulphuric ether; chloral hydrate is often used as an anodyne, but not as an anæsthetic.

The animal is usually cast, legs tied, and, when everything has been prepared for the operation, a large sponge, saturated with chloroform or ether, is held to the nose, being re-wet every little while, as long as may be necessary. The nose is sometimes enclosed in a bag, so as to confine the fumes, but it is better not to do this. The risk thus run vastly outweighs the few advantages it offers. If sufficient air is mixed with the anæsthetic, there is no danger, but horses usually struggle very severly during the exciting stage.—just before they go under its influence, and, on that account the method mentioned is not considered safe by many of the best authorities.

II. Bandages.

These are very important adjuncts to the treatment of lameness, when in the legs, and, also, in stopping a hemorrhage and dressing wounds. They should be applied smoothly, and with moderate pressure. For lameness and dressing wounds, coarse unbleached muslin is the best. For binding on a sponge or other substance, to stop bleeding, the many-tailed bandage is very convenient. For moderate pressure, as in case of windgalls and stocked legs, the Derby bandage is very useful. Elastic bandages are good when considerable tension is desired, but they need careful application, to avoid abrading the skin.

III. Bleeding.

Bleeding is an old time practice that has almost become obsolete, on several accounts, of which the principal seems to be that the congestion and pulse can be controlled by other means less depleting and weakening, thus giving the animal a better chance to recover by husbanding his strength. Then, again, the seasons and atmosphere have so changed that diseases, especially of the lower animals, are more likely to become epizoötic, with typhoid symptoms and great nervous prostration, when it is utterly unsafe to bleed. Still, bleeding is valuable in cases of congestion, when there is a full, strong pulse and no

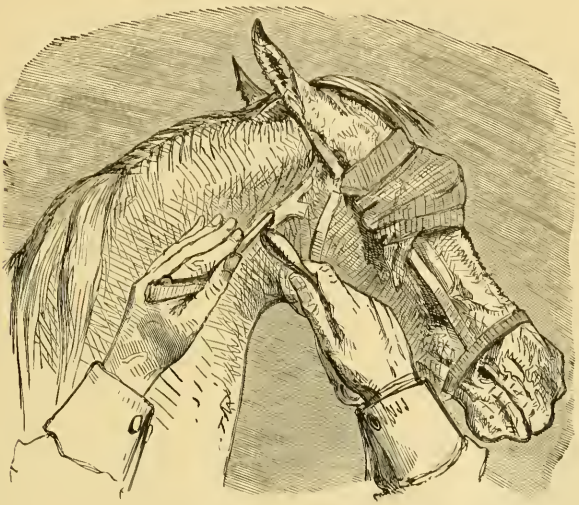
MANY-TAILED BANDAGE.

RAISING THE VEIN BEFORE BLEEDING.

1. The place to cut.

weakness, but only in the first stage—never when the temperature of the patient is abnormally high and the system has become weakened.

The finger is pressed on the vein, to make it fill; or a cord may be tied sufficiently tight around the neck. Then place the blade of the fleam on the vein, at the point indicated in the illustration, and strike it a good smart blow with a round stick, commonly called the blood-stick; have a bucket in readiness, and catch the blood in it, to know how much you draw. Draw from two to six quarts, according to age and size, and the conditions of the case. It is a good plan to blindfold the horse to avoid his



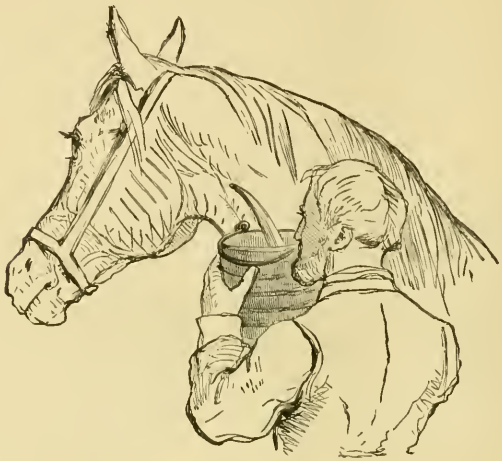
STRIKING THE FLEAM WITH THE BLOOD-STICK.

jumping away from the blow of the blood-stick. When sufficient blood has been drawn, remove the cord or other obstruction, when the flow will stop. Insert a pin and weave a hair or silk thread around the pin in such way as to describe a figure 8. Leave it in for a few days, when it can safely be removed.

IV. Blistering.

When a severe blister is desired, the hair should first be clipped off very close or shaven. Apply the blister a little at a time, and rub it well in, with sufficient friction to get up considerable heat between the hand and the skin; then, when sufficient is rubbed in, smear some over the surface, and tie the horse up sufficiently short to prevent his getting his mouth

to it, or he will bite and blemish the sore and blister his lips. Keep him thus tied up from twelve to twenty-four hours, smearing fresh lard over



CATCHING THE BLOOD.

it at the end of ten hours, to relieve the pain by keeping the air from it, which it will do without interfering with the blister. After about two days, begin washing it with warm water and a very little soap. Soften off the scabs, and clean the skin around the blister; and when dry, apply the grease. Repeat this once, daily. If the scabs are not softened off when pus collects under them, the pus burrows, and if not liberated, is apt to blemish.

A HOCK WHEN BLISTERED.

In mild sweat-blisters, it is not necessary to clip off the hair. Simply rub the blister in gently once a day, till sore enough, then grease once a day till nearly healed. Repeat this as often as necessary.

Ointments are preferable to liquid blisters as being more manageable, and because they can be kept where wished, while liquid blisters are apt to run.

V. Casting.

There are many ways of casting a horse, all having some merit. The chief point to be remembered is to throw him carefully, as broken back, broken hips, etc., are among the dangers that attend carelessness. The

most convenient way is to put hobbles on the feet, and run a chain through the D's, and draw the feet all together, having a rope running from one arm over the back, to make him fall on the side desired; also, a good man at the horse's head to prevent his throwing it around and falling on it, and thus breaking his neck. Always put down a good bed beforehand, for him to fall on.

Rarey's plan of casting is good, in the absence of hobbles, viz: Tie up one fore leg; then tie a strap to the pastern of the other fore leg, and pass it over the horse's back; standing at the shoulder, push him over a step, at the same instant pulling up the foot and bringing him to his knees. He will do some rearing and jumping about, but when he gets tired, he will lie quietly down, when his legs can be tied and held down. To prevent him from pounding his head, it is necessary to place a good man there, who should put one knee on his neck and turn his nose up at an angle of forty-five degrees. As a safeguard against too severe straining, tie a rope from just above one knee to above the hock of the leg on the same side, and draw the legs as close together as possible, and confine them there. This lessens his power to struggle.

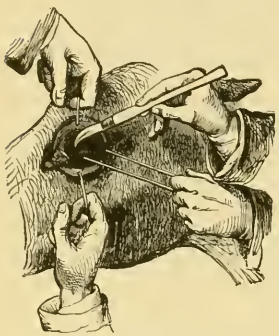
VI. Castration.

The best age for castrating colts is from one to three years, the exact time to be determined by the development of the neck and fore parts. If these are heavy, castrate early; if light, he will thicken up and grow heavier, by being left entire another year. Prepare him by giving soft food for a week previous, and nothing at all for about twelve hours before the operation. Cast him, and roll him up on his back; tie the hind feet down to a surcingle; take the scrotum in the left hand, and draw it over one of the testicles so as to bring the dividing line between the two sides over it; next draw a small superficial slit about half an inch from the line, (one on each side of it,) thus marking the proper place to make the incision; then cut one slit through to the testicle, letting it out; slit open the inner coverings, one by one, till the testicle pops out clean from all the coverings; (avoid wounding the testicle with the knife, as this would cause profuse bleeding, and interfere with the work;) then separate the tunics from the small end, and let them drop down over the cord; put on the steel clamps, to hold the cord while the ecraseur is being applied; put the ecraseur on as low as possible, and with it bite off the cord, still holding on to the latter with the clamps. Let go the cord, and operate on the other testicle. Rinse out the sack with cold water, and let him up. To avoid danger from bleeding, it is advisable, especially in the case of old stallions, to take up the artery before using the ecraseur, and tie it.

The old way of castrating with clamps is convenient, but it gives rise to an immense amount of pain, and is a quite inferior method compared with using the ecraseur.

VII. Extirpation of the Eye.

In cancerous growths in the eye, it is sometimes necessary to extirpate that organ. After casting the horse, pass silk threads through the lids, so that an assistant can hold them open; then, with a sharp knife, dissect the eyeball out, cutting the muscles as they come, one after another, and, finally, the optic nerve. Dress the socket with lotion No. 39, for a few days; then change to lotion No. 7. As this is a very painful operation, an anæsthetic should always be used, if a skillful man can be got to manage the case.



EXTIRPATION OF THE EYE.

VIII. Firing.

This is the application of the actual cautery (burning by red-hot iron) to set up a great amount of counter-irritation or of adhesive inflammation. Its most common applications are for ring-bones, curbs, and sprains of the back, tendons, etc. Clip off the hair, cast the horse, and draw the edges (which should be blunt) of the firing-iron on the skin, making a yellow crease on it, but avoid cutting through the skin, as that would blemish more. Draw the lines, in the form of a feather, over a considerable surface; let the horse up, and rub in the blister immediately. Give absolute rest for a month, and a run at grass for two months.

IX. Lithotomy.

This is an operation to extract a stone from the bladder. Cast the horse, and insert a metallic sound into the penis to reach up to the curve; cut down to it on the curve, then insert a hidden bistoury, and open the passage into the bladder, making it large enough to allow of the stone being got out. Insert forceps with one hand, the other hand being in the rectum and following up the stone and crowding it out. If too large to extract whole, try and break it up with the forceps.

If the patient is a mare, it will not be necessary to cast the animal. She can be controlled sufficiently by using a twitch, which is a loop of strong, small rope, on the end of a small stick, for twisting the upper

lip as shown by the cut in Section XIV of this chapter. Insert the bistoury *cache* into the bladder, the opening to which will be found on the floor of the vagina, about three to six inches from the external orifice; open the neck of the bladder, and then, with one hand in the rectum, the stone can be drawn.

In either case above described, dress the wounds with lotion No. 39, twice a day. The wound in the skin of the horse can be sewed up. When dressing the wound, rinse out the bladder with tepid water.

X. Lithotrity.

This is the name given to the process (mentioned in the last section) of breaking the stone into small pieces with forceps, and taking it away a little at a time. It is sometimes so large as to make it absolutely necessary to do this, or, in some cases, even to saw it in two.

XI. Neurotomy.

This is an operation to destroy sensation in the foot, in some cases of chronic, incurable lameness. Cast the horse, and, after clipping off the hair over the spot to be operated on, cut in through the skin to the nerve three or four inches above the fetlock, just back of the cannon, where it will be found running in the same sheath with the artery and vein. The last two, however, are deeper seated and together, the nerve running on the top of them. Make the incision half or three quarters of an inch long, lengthwise of the leg; dissect away the cellular tissue; raise the nerve, and pass a thread of silk around it, and tie a knot; (if it is the nerve that is tied, the horse will struggle violently from the pain, but if, from accident or mistake, the artery or vein has been taken up instead, there will be no pain, and consequently no struggle); sever the nerve above the silk with a sharp knife; then, cutting below the silk, take out a section of the nerve about three quarters of an inch long. Take a stitch in the skin, and dress with Friar's balsam three times a day.

The foregoing is known as the high operation. If the lower operation is preferred, the incision is made about midway down the long pastern bone, on either side of it. The former is usually considered the better one, as it takes away the sensation from the entire foot, while the lower only takes it away from the heels; there are filaments from the anterior branch of the nerve, extending down to the heels, which destroy the desired effect, to a great extent.

Neurotomy should never be performed except as a last resort; for it does not cure the disease, but only destroys the feeling in the part, so that there is no more pain in it. Although the horse hangs the foot down as though it were sound, it is only a question of time for it to go

all to pieces, either from the tendon giving way, or else by suppuration from a nail wound or corn, extending all around the foot. After neurotomy, it is necessary to be doubly careful in shoeing and taking care of the feet, to avoid the pricks of nails, corns, etc., and, should these occur, to treat them at once, lest bad complications ensue. Some horses work well for four or five years after neurotomy, and some go to pieces in a few months.

XII. Nicking and Docking.

Nicking and pricking are identical in effect, viz: to straighten crooked tails. When a horse hugs his tail, it is sometimes necessary to sever the tendon on the under side, and suspend the tail over a pulley, for two or three weeks. Insert the knife about six inches from the dock, on the under side at one side of the tail; pass it in across the tail, holding it flatwise—on its side; then turn up the edge towards the bone, and, with a sawing motion, sever the tendon. Tie the tail to a rope running over a pulley, with a weight on the other end, and leave it tied up about three weeks.

In case the tail is crooked or is twisted to one side, insert the knife in a perpendicular position from below upwards, just under the skin; turn the edge towards the tail, and saw through the muscle: then tie the tail around to the opposite side for a couple of weeks. It is often necessary to cut in two or three places. If the cuts suppurate, dress them with lotion No. 39. If the first operation fails, try it again.

Docking is amputating a portion of the tail, bone and all, to pander to the taste or whim of the owner. It is best done by laying the tail on a block or end of a post or plank, placing an axe on the spot decided upon, and striking the axe with a maul, thus severing the whole thing at one blow. Bind up the wound with a sponge and bandages wet with lotion No. 39; tie a rope to the stump of the tail, passing it over a pulley, and leave it so two or three weeks. Dress it once a day. Tetanus sometimes follows this operation.

XIII. Opening an Abscess.

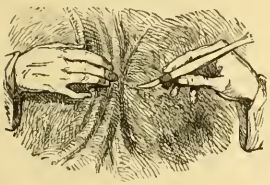
This is a simple matter, when done properly. If improperly done, it is of little use, and the cure is apt to be retarded. When an abscess is ripe and ready to open, ascertain as near as possible where the bottom of it is, and insert the knife at that point, making an opening quite to the bottom for the escape of the pus. If this is impracticable, and the opening must be made at the top, the pus must be evacuated by means of a syringe or sponge, to draw it out. The main point to be remembered is to open it as near the bottom as possible. A twitch on the nose is usually sufficient to keep the animal quiet in this and other minor operations.

XIV. Tapping the Chest, and Tapping the Abdomen.

The chest fills with water in hydrothorax; it is the stage of effusion in pleurisy. The lungs are floated up, and suffocation results. The presence of water in the chest is detected by the solid sound—a sound of fullness—when tapped with the hand, and by the absence of respiratory murmur; and, frequently, the splashing of the water by the action of the heart can also be heard.

OPENING THE ABSCESS OF STRANGLES.
Also illustrating the twitch and manner of using it.

Clip off the hair from a spot about three inches back of the elbow, and five or six inches from the bottom of the chest. Ascertain the exact location where a puncture can be made without striking a rib (the trochar to pass between two ribs); then plunge a scalpel deep into the flesh, making a hole through the skin and flesh for the trochar; insert the latter instrument and withdraw the trochar, leaving the cannula to act as a spout; hold a pail and catch the water. If pieces of lymph clog the cannula, pass in a small probe and push them off the end. Drain off all the water and withdraw the cannula. It is often necessary to repeat this operation.



OPENING THE SKIN.
reparatory to tapping the chest.

This operation is technically termed *paracentesis thoracis*. Cases so severe as to require it are usually fatal.

WATER FLOWING FROM THE CHEST.
In paracentesis thoracis.

Paracentesis abdomenis means, in plain English, tapping the belly. In peritonitis, the belly often fills with water, which can be evacuated by inserting the trochar and cannula on the median line, a couple of inches back of the navel. The operation may be repeated, if necessary; but, in this case, it is advisable to make a fresh hole, rather than insert again in the old one.

XV. Pricking.

This is identical with nicking, (which see).

XVI. Probing and Opening Fistulas.

It is necessary to probe fistulous openings, in order to know where they go. Take plenty of time, and do it carefully.

Find every sinus, if possible. When practicable, the best and quickest way to cure them is to open them right up along their whole length; but when this cannot be done without severing large blood-vessels or too much muscular fibre, pass a seton through them and draw in caustic substances, such as burnt alum, powdered blue-stone, etc. Or, instead, use injections Nos. 1, 3 and 5, changing from one to another frequently.

XVII. Spaying.

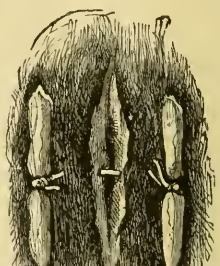
This operation is very rarely performed upon the mare—never, in fact, except in case of disease. There is great danger of its proving fatal, and hence it should never be undertaken except by a skilled veterinarian. It consists in removing the ovaries, corresponding to the castration of the male.

XVIII. Sutures.

There are four kinds of sutures, viz: the interrupted, uninterrupted, quilled and twisted. The interrupted suture is the one generally used, and for most cases is the best. The needle and silk—or, instead of the silk, the silver wire or cat-gut—are all that are needed. Clip off the hair from the edges, and be careful to have everything clean. Draw the edges of the wound together with a slightly curved needle and silk, and when tying the knot give the ends an extra turn through the knot, which will keep it from drawing away and untying; then go on and make a hard knot on the top of the other, and cut off the silk. Then take another, and so on.

UNINTERRUPTED SUTURE.

The continuous or uninterrupted suture sews up the wound by continuing the stitches right along, the same as in sewing cloth, and tying the ends. The quilled suture is when two quills or pieces of wood are used as skewers, and the ends of the silk caught over them, the skewers being placed one on each side of the wound, to prevent the stitches from tearing out. The twisted suture is simply a pin inserted and a hair or silk thread wound around its ends in the form of a figure eight, as already described in the article on bleeding. In most cases, the stitches ought to be taken about half an inch apart.



QUILLED SUTURE.

XIX. Tapping the Belly for Flatulence.

It is usually either some of the large intestines or the stomach that is affected with flatulence. The former are tapped by inserting

the trochar and cannula upon a level with the stifle, and below the large muscles. Plunge it in and, withdrawing the trochar, leave the cannula to carry off the gas. If excrement gets into the hole, insert a small probe and push it away. This may be repeated, if necessary, always using a small trochar, (one about a quarter inch in diameter), and inserting it in a new place each time.

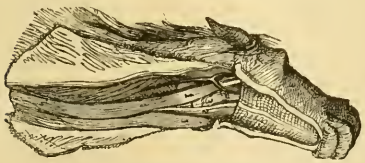
XX. Tenotomy.

When the tendons become very much contracted and cannot be relaxed, they can be severed, when the ends will extend, grow together again, and thus repair the excision. This operation, called tenotomy, is most commonly practiced on the tendon of the leg, and about midway between the knee and fetlock. Insert the knife across the tendons, with the blade on its side; let it go just to the skin on the other side, but not through it; then turn the edge towards the outer part of the leg and saw away, taking care not to cut the skin at the back of the leg. When the tendons are severed, break up the adhesions by bending the leg across your knee. Dress the wound in the skin, treating as a simple wound.

PERFORMING TRACHEOTOMY.

XXI. Tracheotomy.

This consists in the insertion of a tube into the trachea or windpipe, to prevent death from threatened suffocation. The tube ought to be of silver, but in the absence of that, one made of tin will, in the writer's opinion, answer every purpose; it should be three quarters of an inch or an inch in diameter, curved so as to slip into the windpipe easily, with a plate of the same material on the end to tie to the neck, in order to keep it in place. Open the skin by an incision about two inches long, at a point eight inches below the throat; divide the muscles, and lay



THE STRUCTURES MET WITH IN THE OPERATION OF TRACHEOTOMY.

1. The sterno maxilaris muscles, (a pair), which have to be separated, being joined by cellular tissue.
2. The sterno thyro hyoidei muscles lying under those above mentioned. These also have to be separated, being similarly united.
3. The trachea, which will be fully exposed when the muscles are separated and pulled back.

bare the wind-pipe; cut out a piece of two rings, making a hole large enough to admit the tube. Take the tube out and clean it with carbolic lotion No. 39, once a day, and replace it as soon as possible. When the cause of suffocation is removed, the tube may be taken out for good. The hole will soon fill up and heal.

CHAPTER XXIII.

CONCERNING THE VETERINARIAN'S CERTIFICATE OF SOUNDNESS.

I. EXAMINATIONS IN THIS COUNTRY AND IN EUROPE.——II. WHAT THE VETERINARIAN SHOULD SEE TO, FOR HIS CLIENT.——III. CONDITIONS MODIFYING THE CERTIFICATE.——IV. THE SELLER'S GUARANTEE SHOULD COVER VICES.

I. Examinations in this Country and in Europe.

Under what circumstances can a horse be returned to the seller, as unsound? This we propose to consider briefly, even though at the risk of a little repetition of directions given elsewhere. In Europe it is quite a common practice to have horses examined for soundness by experts, but in this country, where every man professes to be a horseman, there is much less of it done. Here, if a man gets bitten in making a trade, he usually says nothing, but contents himself with getting satisfaction out of the next one. Still, there are some examinations made for soundness even in this country, and it may be well to state what a veterinarian bases his decision upon, in giving a certificate.

II. What the Veterinarian should see to, for his Client.

The age, size, and general appearance of the animal should first be considered; also, his adaptability to the purposes in view. It is the veterinarian's duty to use his influence to prevent his client from buying a draft horse for his carriage, or *vice versa;* in fact, he should consult not only his client's needs, but his wishes and tastes as well, and should see that these are met as fully as possible.

In making the detailed examination, he should see that the mouth and tongue are all right, no poll evil, no running at the nose, no cough, fistulous withers, nor anything wrong with the head or shoulders. He should see that the fore legs are free from bony deposits, and the feet from corns, sidebones, contraction, etc.; that there are no ruptures on any part of the belly or scrotum, no broken hips, nor broken tail. He should carefully note whether the hind legs are free from bony deposits, capped hocks, and spavins of all kinds, and make sure that there is no thickening of any of the tendons of either the fore or hind quarters, nor yet any windgalls or curbs.

Next, move him for the detection of lameness—slow, fast, turning, backing, stopping and starting again; and also for the wind—whether thick or broken, and whether there is roaring, whistling, or wheezing.

ONE TEST FOR ROARING.

Then examine the eyes closely—first in the sunlight, next in a dark place, and then in the sun again—to detect any abnormal expansion or contraction of the pupil, and for opacity or cloudiness of the cornea, and clearness or otherwise of the humors of the eye.

III. Conditions Modifying the Certificate.

Any disease of any kind existing at the time—internal, skin or otherwise, is, strictly speaking, unsoundness. There are some conditions, however, which, though they are not absolutely sound, do no harm, and these should be mentioned with a view of qualifying the certificate. Under this head will come splints, when not near the knee; feet that show the previous existence of corns, but having none at present; and curbs, when old, as these, though objectionable, do not often hurt a horse for work, either fast or slow. The previous existance of fistulous withers, if entirely cured and sound at present, is not unsoundness; but marks of poll-evil would make an animal objectionable, as it indicates a tendency to rear and, perhaps, to fall backwards, throwing the head violently upwards, etc.

IV. The Seller's Guarantee should cover Vices.

The seller should guarantee a horse free from vice as well as sound, for vices cannot always be detected, even by the most critical examination. Under such a guarantee, a cribber; a windsucker; a kicker, either in the stall or harness; one that pulls back, and breaks the halter, and a shyer, are all returnable.

In case of any departure whatever from an absolutely healthy, natural condition, the surgeon, in justice to himself as well as his client, should state his opinion as to how much the defects noticed are likely to depreciate the value.

CHAPTER XXIV.

POISONS AND THEIR ANTIDOTES.

I. GENERAL RULES.——II. POISONING FROM DRUGS, MINERALS, ETC.——III. POISONING WHILE GRAZING——IV. POISONING OF THE SKIN.——V. POISONING FROM STINGS.

I. General Rules.

Horses are frequently poisoned, sometimes by eating noxious plants or by getting hold of poisonous substances left about the stable: sometimes by malicious persons, from motives of revenge toward the owner, or to advance some personal interest; and sometimes by overdoses of strong drugs. It is well, therefore, to know some of the more common poisons, with their modes of action and their antidotes; and it is, of course, extremely desirable to be able to find and use suitable remedies with the least possible delay, since the loss of only a few minutes will, in some cases, cost the animal's life. A few general directions, like the following, it will pay the reader to commit to memory, and thus have them at instant command:—When the animal is poisoned by an alkali, give him an acid, such as vinegar, &c. For poisoning by an acid, give an alkali, such as bi-carbonate of soda (baking soda.) Both the articles here specified are nearly always on hand.

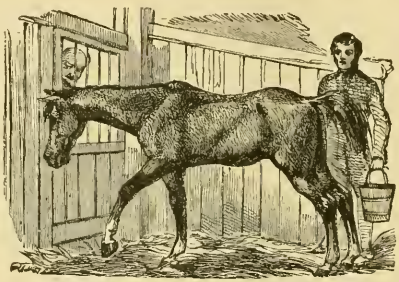
II. Poisoning from Drugs, Minerals, etc.

Aconite is frequently given in overdoses, causing profuse perspiration; spasms of the glottis, seen in the continual swallowing when there is nothing to swallow; congestion of the lungs, with difficult breathing; gastro-enteritis (inflammation of the stomach and bowels); and quick pulse, gradually becoming imperceptible. Give strong coffee, in pint doses, every fifteen minutes till relieved.

Arsenic is sometimes got hold of. It is a corrosive, irritant poison, causing diarrhœa, mucous discharge from the eyes and nose, a quick, wiry pulse, and injected mucous membranes. Iron sesqui-oxide (iron rust) is the best chemical antidote. It is prepared by dissolving copperas and bi-carbonate of soda in water, separately, and mixing the two solutions, when the iron rust will fall to the bottom. Wash it with warm water, put in a bottle, and give three or four tablespoonfuls every ten or fifteen minutes. Being insoluble, it will have to be washed down the

animal's throat with plenty of water from the bottle. In the absence of this remedy give eggs, oils, milk, powdered charcoal, or blue clay.

Aloes in large doses is poisonous. It produces diarrhœa and superpurgation; dryness of the mouth; yawning and straining; quick, hard pulse, gradually becoming imperceptible; injected mucous membranes; and, sometimes, irritation of the kidneys. Give powdered ipecacuanha, in half drachm doses, every hour; starch gruel, internally, and enemas (cold) of the same, with one ounce of laudanum in each injection, repeating both gruel and enemas every hour; opium, in drachm doses, every four to six hours; chalk; port wine; and hot fomentations to the belly.



GASTRO-ENTERITIS.

Appearance of a horse suffering from inflammation of the stomach and bowels.

Ammonia, carbonate, is sometimes given in too large doses or not sufficiently diluted, when the mouth, throat and stomach become burned and blistered, and salivation follows. Give olive oil in doses of two or three tablespoonfuls, five or six times a day: also, milk and eggs.

Belladonna is a favorite remedy with some, and, when much used, is apt to be given carelessly and in too large doses, giving rise to dilatation of the pupils, narcotism (stupor), swelling of the head, and delirium. On post mortem examination, the blood will be found fluid; and decomposition sets in early. Apply mustard to the chest, and cold to the head; give milk and linseed oil—a pint of each, mixed,—and gentle exercise.

Bryony is often given with aconite. Over doses cause gastro-enteritis; liquid fœces; scanty, bloody urine; and a quick, almost imperceptible pulse. Give a pint each of milk and linseed oil, mixed, with an ounce of laudanum in it; starch gruel injections, with an ounce of laudanum in each one; and hot cloths to the loins.

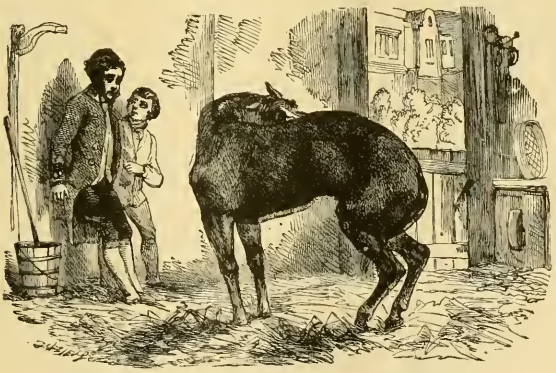
Calomel is a corrosive, irritant poison, causing a discharge of black offensive fœces, diarrhœa, and great depression. Give opium, in drachm doses, three times a day; also use flaxseed tea.

Cantharides is a narcotic, irritant poison, causing gastro-enteritis, great irritation and inflammation of urino-genital organs, imperceptible pulse, and injected mucous membranes. Give a pint of linseed oil, which follow, after an hour, with large quantities of flaxseed tea or mucilage; apply hot cloths to the loins; give starch gruel and laudanum injections; and opium, in drachm doses, three or four times a day.

Chloroform is a narcotic poison. It causes a slow pulse; slow, heavy breathing; insensibility to pain; muscular twitchings; dilatation of the pupils; foaming at the mouth; and stupor. Throw cold water over the animal; raise and lower the fore legs continuously; pound the chest to induce respiration; use bellows in the nostrils; and give sweet spirits of nitre, in ounce doses, at intervals of half an hour, till two or three doses have been given.

Chloral Hydrate is similar, both as to its effects and antidotes, to chloroform

Croton Oil is an acrid, irritant poison. It may be either swallowed or absorbed from the skin, and causes gastro-enteritis, drastic purgation, and great prostration. The treatment is that for superpurgation.



DRASTIC POISONING.

Characteristic appearance and action of a horse suffering from this cause.

Copper Sulphate is a corrosive, irritant poison, bringing on gastro-enteritis and diarrhœa; ulceration, perforation and thickening of the mucous membranes; quick, hard, almost imperceptible pulse; and, near smelting works, emaciation, paralysis and exostotic disease of the joints. These latter symptoms characterize the chronic, slow poisoning resulting

from grazing in the vicinity of these works, and inhaling the condensed fumes or eating the poison-tainted grass; and the remedy is self-suggestive, viz: to remove to a greater distance from the works. In the acute poisoning, give a pint of linseed oil, eggs, soap in small quantities, and milk, or flaxseed tea.

Corrosive Sublimate is frequently got hold of in the form of rat-poison, and is a corrosive, irritant poison, causing gastro-enteritis, erosion of the mucous membranes of the stomach and bowels, fœtid diarrhœa, salivation, fœtid breath, quick, weak pulse, and yellow appearance of mucous membranes. Give eggs and milk in large quantities, with occasional doses of opium—a drachm at a dose.

Ergot of Rye is a fungus that grows on rye and other kinds of grain, and which is developed on low, undrained soils by long continued damp weather. Large doses cause narcotism, colic, diarrhœa, and perverted nervous action; impairs the appetite; induces weakness and wasting, and serous—sometimes bloody—discharges from the mucous surfaces; and in a bad case, œdema and gangrene of the ears, tail, and even the limbs. Give a pint of linseed oil, following it with large quantities of flaxseed tea, and give a drachm of opium three or four times a day.

Ferrum Sulphas, (sulphate of iron), is a corrosive, irritant poison, causing the same symptoms as sulphate of copper. Give, as an antidote, galls, powdered, half an ounce; or, bi-carbonate of soda, an ounce. After a few minutes, give large quantities of flaxseed tea. Repeat the entire treatment every few hours.

Nux Vomica is an irritant poison, manifesting itself by tetanic spasms and general convulsions; convulsions of the diaphraghm, causing labored breathing; and, sometimes, asphyxia. Give hydrated chloral in doses of half an ounce, every two hours, with occasional doses of opium: also, employ galvanism when practicable.

Opium is a narcotic poison, producing partial or total paralysis, stupor, stertorous (labored) breathing, slow pulse and contracted pupil. After death, the blood is fluid, and decomposition sets in early. Shower with cold water, give tannin, half a drachm, and an occasional dose of sweet spirits of nitre—half an ounce at a time; and force the animal to take exercise.

Lead, in all its forms, is a corrosive, irritant poison, which, in acute cases, produces violent constipation, delirium, colicky pains, tremor of the muscles, and gastro-enteritis. In chronic cases, where the symptoms develope slowly, there will be noticed what is called *Plumbism*—exostotic deposits, anchylosis of the joints, paralysis, staring coat, a blue line around the gums, emaciation, quick and wiry pulse; with fœces black, glazed and fœtid, the abdomen tucked up, and constant moaning. Give

epsom salts, two to four ounces; after an hour, give iodide of potash, two or three drachms; accompany these with occasional doses of opium in drachm doses; put mustard paste to the belly; and use large quantities of flaxseed tea,

Nitrate of potash, in large doses, is an irritant poison, causing gastro-enteritis, (with vomition in pigs), injected membranes, inflammation of the gullet, colic, etc., and it has a powerful sedative action on the heart. Give linseed oil, and follow it with flaxseed tea and whisky; put mustard paste to the belly and over the gullet.

Common salt (or sodium chloride), in large quantities, acts as a corrosive, irritant poison, causing gastro-enteritis, injected mucous membranes, diarrhœa, weak and irritable pulse and excessive thirst; also vomition in dogs and pigs. Give milk and eggs, with a drachm of opium every three or four hours; if there is abnormal pain, apply mustard paste externally.

Sulphur is an irritant poison, causing diarrhœa, gastro-enteritis, emaciation, and ebullitions of sulphuretted hydrogen gas from the anus, (foul wind-breaking). Give a dose of oil, with opium; also starch gruel, both internally and as an injection.

Strychnia is to be treated for the same as nux vomica.

Turpentine is an irritant poison, causing gastro-enteritis, strangury of the kidneys, quick and hard pulse, diarrhœa, and a violet odor and high color to the urine. Give a small dose of oil, with opium, starch gruel, and laudanum, both internally and as an injection; put hot cloths to the loins.

White Hellebore, (*veratrum album*) is an irritant poison, causing vomition in dogs and pigs; in the horse, intermittent pulse, gastro-enteritis, diarrhœa, spasms of the superficial muscles, salivation and great prostration. It is liable to be absorbed from the skin as well as taken internally, doing the same amount of damage in either case. Give eggs and milk in large quantities, and small doses of olive oil and sweet spirits of nitre.

III. Poisoning While Grazing.

Acorns when eaten in large quantities, cause gastro-enteritis; constipation, followed by fluid fœces; offensive breath; glazed eyes; quick, wiry pulse; discharges from the nose; and gnashing of the teeth. Post mortem examination discovers acorns in the stomach; inflammation of the coats of that organ and of the bowels; and, sometimes, ecchymosis and gangrene. In the case of cattle, *rumenotomy* must be performed to remove the undigested acorns. For horses, etc., give oil and gruel, with laudanum, and follow these with gentian root, in two to four drachm doses, three times a day.

Copper sulphate poisoning, in its chronic form, from grazing near smelting works, has been considered in the previous section.

The tobacco plant is a narcotic, irritant poison, causing gastro-enteritis, convulsions, metastatic inflammation, contracted pupil, sweating, intermittent pulse, diarrhœa, stertorous breathing, and stupor. Treat the same as for opium.

Sumach, or *Poisonous Oak*, is an acrid poison, causing gastro-enteritis, etc. Give oil, opium and flaxseed tea.

Lobelia is an acrid, narcotic poison, causing salivation, gastro-enteritis, feeble pulse, convulsions, and stupor. Give oil, opium and mild stimulants.

IV. Poisoning of the Skin.

Vegetable poisoning of the skin is not an uncommon occurrence, from the nose or lips of the animal coming in contact with some noxious weed or plant while grazing. There are many such plants, besides the poison oak and white hellebore noticed in the preceding section, such as poison ivy (or poison vine), hemlock, St. John's wort, etc. The symptoms of such poisoning correspond very nearly to those manifested in the human economy from the same cause, and which every one living in the country is familiar with. The treatment is both constitutional and local,—the former by the use of alteratives, together with such purgatives as may be required to keep the bowels moderately loose; the latter, by washing the irritated surface with a solution of sugar of lead, or other cooling and healing wash.

V. Poisoning from Stings.

In many sections, every farmer is liable, in the summer season, to have his team severely stung by hornets, bumble-bees, or the like; while in the Southwest, the torture inflicted on stock by the swarms of certain gnats and poisonous flies is fairly maddening. Then, too, a stock man in the latter section is almost sure to occasionally meet with such urgent cases as rattlesnake or tarantula bites.

A homely remedy for the sting of bees, wasps, etc., is to wash with salt and water; and this is excellent, in ordinary cases. Onion juice is another. For severe cases, it will be better to anoint the parts with a compound of hartshorn and oil,—three parts of the former to one of the latter; or spirits of turpentine and laudanum, in equal parts, will afford relief. It will be a good idea, if the irritation is very great, to sponge the whole body with lime water or a weak solution of soda, and then smear with linseed oil.

To protect against gadflies, wash the flanks and parts most likely to be attacked, with a strong infusion of the green bark of the common elder.

To protect against buffalo-gnats, etc., that are so troublesome in the lower Mississippi regions, smear the parts they most affect with a mixture of tar or lard, in the proportions of one to two, respectively; or instead, with equal parts of petroleum, lard oil (or bacon drippings), and tar.

For the bite of a rattlesnake, copperhead, or other venomous serpent, give the following as quickly as possible:

No. 90.
1 Teaspoonful of hartshorn,
1 Pint of whiskey,
½ Pint warm water,
Mix.

Cauterize the wound immediately, with an iron at white heat; and keep the adjoining parts constantly wet for some hours, with ammonia, by means of a sponge. Unless the symptoms are urgent, the above recipe may be made up with half a pint (instead of a pint) of whiskey; but in every case it will be best to repeat this smaller dose every hour, till relief is obtained.

Stings of centipedes, scorpions and venomous spiders, (of which the tarantula is the most common), should be treated the same as snake bites; but, in these cases, it is not so customary to cauterize.

CHAPTER XXV.

INSTRUMENTS, APPARATUS, AND MEDICINES.

I WHAT INSTRUMENTS TO KEEP, AND HOW TO USE THEM.——II. SURGICAL APPARATUS AND APPLIANCES.——III. A CHEAP AND SERVICEABLE SURGICAL OUTFIT.——IV. VETERINARY MEDICINES AND DOSES ——V. WHEN AND HOW OFTEN MAY THE DOSE BE REPEATED?——VI. SIMPLE DIRECTIONS FOR PREPARING AND USING MEDICINES.——VII. WEIGHTS AND MEASURES.

I. What Instruments to Keep, and How to Use Them.

Bistoury.—For making incisions. It consists of a handle to which is attached a blade, variously shaped, according to the exact use intended, and either fixed or movable.

Catheter.—Used to draw off the contents of the bladder when the horse cannot make water in the natural way. Also used in treating deep ulcers, liquid being injected through them by means of a syringe. In veterinary practice, it is a round gutta percha tube, of which one end is open, and the other rounded with two openings at the side near by. Oil well, and introduce cautiously; then slowly push it along the canal or passage, taking care to occasion no unnecessary pain.

Firing-iron.—For making the actual cautery (burning with red-hot iron), which, though less practiced than formerly, is still useful in certain cases elsewhere specified. It is a heavy iron, with a blunt edge and a handle to hold it by.

Fleam.—Strictly speaking, one kind of lancet, and that which in old times was alone used in veterinary practice. The manner of using it is fully explained in the article on bleeding. The incision must always be made lengthwise of the vein.

Forceps.—Used for extracting splinters, pieces of bone, etc., and in the operation of lithotomy and lithotrity; also, for seizing arteries in order to tie them. They are simply pincers with long jaws. Those with a spring are much to be preferred.

Knives.—At least three or four different knives should be kept, and always keen and bright, for surgical purposes—some rounded and others pointed at the top. (See scalpel and shoeing-knife.)

Lancets.—There are two kinds, thumb and spring lancets, these names being derived from the power that operates them. They are a great improvement upon the fleam, which is their primitive form. We give the preference to the thumb lancet.

Needles (surgical).—For sewing up wounds, etc. They are of different shapes as well as different sizes. (See seton needles.)

Probang.—A straight, flexible rod, with a sponge on one end, for pushing substances down the throat, in cases of strangulation. Two kinds are shown in the cut on page 358.

Probe.—For exploring wounds. They are made of silver wire with one end slightly knobbed, and of different sizes.

Scalpel.—A surgeon's knife, straight and keen edged. For veterinary purposes, it should be broad and strong.

Scissors (curved).—Indispensable for trimming the edges of wounds, clipping off the hair, etc.

Seton needles.—For drawing setons under the skin. Their blades are broad and curved, with a round shaft eighteen inches long and one eye at the blunt end.

Shoeing-knife.—Sometimes called the frog-knife or drawing knife, being the knife used by blacksmiths for cutting into and paring the hoof, in horseshoeing. It is a thin blade with a sharply curved end, fixed in a handle, and will be found quite useful in the care of the horse's feet, in health, as well as in treating the same when diseased.

Syringe.—There are regular horse and cattle syringes now procurable. For giving small doses of liquid medicines one that can be worked with one hand is almost indispensable. The old-fashioned pail and india-rubber pipe is a clumsy, yet in most cases, efficient substitute in giving injections. A small syringe for injecting abscesses, cleaning wounds, etc., will also be desirable.

Trochar.—A simple surgical instrument, resembling a pointed awl. It is now generally provided with a cannula, which is a hollow tube enclosing it. (See cut on page 724.) Its uses in puncturing the abdomen, chest, &c., have been repeatedly given elsewhere, the cannula, as a rule, being allowed to remain in the orifice, as a channel for the escape of the water, serum, or gas, as the case may be.

II. Surgical Apparatus and Appliances.

In addition to the instruments described in the last section, there are various apparatus and appliances which the stock owner should always keep on hand, or at least have at ready command in case of need. The following list will, we think, be found sufficiently complete for all practical purposes.

Drenching bottle.—This is now generally used, instead of the old-time drenching-horn. It should hold a quart at least, and have a long neck. A champagne or ale bottle will be about the thing.

Hobbles.—To prevent a horse from kicking; more especially, for use in casting. (See article on casting in chapter XXII of this Part.) They are two strong ropes, each about twenty-five feet long, with the same number of strong leather straps, doubled, each with a two inch seam between and a strong buckle. It requires three or four men to cast a horse. Put a loose collar on the horse, and fasten both ropes securely to the bottom of it, or, better (if the rope is long enough), loop the middle to the collar. Buckle one of the two leather straps tightly on each hind pastern; through the rings or D's of the straps pass the ends of the rope, carrying the same forward through the collar, for the assistants, (standing well ahead) to pull away at, while a good man manages the animal's head. To prevent kicking (while standing), fasten the ends of the rope to the collar, after drawing sufficiently tight.

Ligatures.—Cords or strings, most commonly silk thread, used for tying arteries and thus preventing or stopping hemorrhage. Tie with a surgeon's knot, made by passing one end around the other twice and then drawing tightly.

Nose-bag.—This should be roomy, and be kept scrupulously clean.

Seton.—A cord or small roll of leather, tape or cloth, drawn under the skin and then out again at a short distance, by means of the seton needle. It is used to promote and keep up a discharge of pus, and thus reduce inflammation, and, the better to secure this end, it is soaked with turpentine or smeared with some other irritant, and daily turned or drawn forward and backward through its channel. Setons have almost entirely superseded the old-fashioned rowel, which is a ring of leather, suitably prepared and pushed down into a pocket made in the skin.

Slings.—These are well illustrated on pages 250 and 286. They are not so difficult to make as many imagine. Take, for the girdle which passes under the horse's belly, a broad strip of leather or strong canvass twenty-eight inches wide and about seven feet long, stiffening the ends by sewing them around smooth sticks or chunks of wood, to which fasten very strong loops of rope. Double blocks and pulleys being attached to these loops by strong ropes passing through fixed pulleys overhead, the animal can be nearly or entirely lifted from his feet, as may be desired. This girdle is kept in proper position by suitable breeching and breast-straps attached to it, as shown on page 286.

Sponges.—From four to six of these should always be at hand, of which at least one (a small one) should be very fine. Their sizes should be graduated, the largest being such as are often used for washing carriages.

Tents.—Like setons, these are suppuratives, but are employed in the dressing of wounds. They consist of pledgets of tow, lint, or the like, moistened with turpentine.

Twitch.—This has been described and illustrated in the chapter on Operations. One should be kept hanging in the stable constantly, ready for immediate use.

III. A cheap and serviceable Surgical Outfit.

The following convenient outfit will serve the purposes of the great majority of horsemen, and can be selected, at very moderate cost, from the stock of any surgical instrument dealer. Most of the instruments, in fact, can be bought at the larger drug stores of cities. Everything should be kept together, in a neat wooden box.

1. A thumb lancet, and, if wished, a fleam.
2. A pair of spring forceps.
3. A bistoury, blunt pointed. The slightly curved form, with the sharp edge on the inside, is considered the best for most purposes.
4. An aneurismal (a long, blunt) needle, which is also very serviceable for introducing small setons.
5. A silver probe.
6. A shoeing (or frog) knife.
7. A pair of curved scissors.
8. A broad scalpel, for which, however, any straight, broad-bladed knife, with a keen edge, may be substituted.
9. A seton needle.
10. A few surgical needles, of different sizes and shapes; some white thread, and thin cat-gut or, instead of the latter, fine sewing silk. A leather case or roll will be needed to keep these articles in.

IV. Veterinary Medicines and Doses.

The following list comprises the principal drugs used in veterinary practice, those of them not among the farmer's own stores being easily procurable at any drug store. Many of these it will be advisable to keep always on hand,—say enough for ten doses,—everything in white bottles, the latter well corked and carefully labeled. Corrosive substances it will not do to cork; the stoppers must be ground glass. When medicines have been kept so long that they have lost their strength, they should be thrown away, and replaced with fresh. Old compounds not likely to be used again soon, ought not to be kept with the other medicines. The best plan is to throw them away, as they will only clutter up any cupboard you may put them in, and ten to one, even if you want to use the same prescription again, you will decide to compound it afresh.

For an explanation of the terms below employed in classifying these drugs, the reader is referred to page 237.

Acetic acid.—Antidote to alkalis, cooling astringent. Horse, 1 drachm; ox, 2 drachms; sheep, 1 scruple.

Aconite, tincture of.—Sedative, diaphoretic. Horse, 10 drops; ox, 30 to 40 drops; sheep, 3 to 5 drops.

Alcohol.—Stimulant, diuretic, narcotic. Horse, ½ ounce; ox, 3 to 6 ounces; sheep, ½ ounce. Locally, a cooling astringent.

Aloes, Barbadoes.—Purgative. Horse, 4 to 6 drachms

Alum.—Astringent. Horse, 2 to 3 drachms; ox, 3 to 4 drachms; sheep, ½ to 1 drachm.

Ammonia, liquid.—Diffusible stimulant, anti-spasmodic, antacid, diuretic. Horse, ½ ounce; ox, ½ to 1 ounce; sheep, ½ to 1 drachm. It should be well diluted.

Ammonia, carbonate of.—Diffusible stimulant, anti-spasmodic, antacid, diuretic. Horse, 1 drachm; ox, 4 to 6 drachms; sheep, ½ to 1 drachm.

Anise seed, caraway, cardamon, fennel seed.—Stomachic, carminative. Horse, 1 ounce; ox, 1 to 2 ounces; sheep, 2 to 4 drachms.

Arnica, tincture of.—Stimulant, diuretic. Horse, 1 drachm; ox, 1 drachm; sheep, 1 scruple.

Asafœtida.—Diffusible stimulant, carminative, vermifuge. Horse, 2 drachms; ox, 4 drachms; sheep, ½ to 1 drachm.

Balsam of Peru.—Stimulant, antispasmodic, expectorant. Horse, 1 ounce; ox, 1 to 1½ ounces; sheep, 2 drachms.

Borax.—Nerve sedative, uterine stimulant. Horse, 2 to 6 drachms; ox, ½ to 1 ounce; sheep, ½ to 1 drachm.

Blackberry root.—Astringent. Horse, 2 to 4 drachms; ox, ½ ounce; sheep, 2 scruples.

Camphor (gum).—Antispasmodic. Horse, 1 to 2 drachms; ox, 2 to 4 drachms; sheep, 1 scruple.

Carbolic acid—Sedative, anodyne, astringent, antiseptic, disinfectant. Horse, 10 to 20 drops; ox, 1 drachm; sheep 10 drops.

Cherry bark, wild.—Expectorant. Horse, 1 ounce; ox, 1½ ounces; sheep, 3 drachms.

Copaiva.—Stimulant, diuretic, expectorant. Horse, 2 to 4 drachms; ox, 3 to 4 drachms; sheep, ½ to 1 drachm.

Cream of tartar.—Diuretic. Horse, ½ ounce; sheep, 4 to 6 drachms. Laxative: horse, 5 ounces; ox, 5 to 8 ounces; sheep, 1 to 2 ounces.

Ergot.—Checks bleeding, parturient. Horse, ½ to 1 ounce; ox, 1 ounce; sheep, 1 to 2 drachms.

Iron, peroxide.—Tonic. Horse, 2 drachms; ox, 4 drachms; sheep, 1 drachm. An antidote to arsenic.

Laudanum.—Narcotic, sedative, anodyne, antispasmodic. Horse, 1 to 2 ounces; ox, 2 ounces; sheep, 2 to 3 drachms. The druggist calls this *tincture of opium.*

Lime, chloride of.—Checks tympany, disinfectant. Horse, 2 drachms; sheep, 1 to 2 drachms.

Linseed oil.—Laxative. Horse, 1 to 2 pints; ox, 1 to 2 quarts; sheep, ½ pint.

Lobelia.—Sedative, antispasmodic, expectorant. Horse, 1 to 2 drachms; ox, 1 to 3 drachms; sheep, 15 grains; swine, 5 to 15 grains.

Lunar caustic (nitrate of silver).—Nerve tonic. Horse, 5 grains; ox, 5 to 8 grains; sheep, 1 to 2 grains.

Mallow.—Demulcent. Give freely of cold infusion.

Oak bark.—Astringent. Horse, 1 ounce; ox, 2 to 4 ounces; sheep, 4 drachms.

Olive oil.—Laxative. Horse, 1 to 2 pints; ox, 2 to 3 pints; sheep, 3 to 6 ounces.

Opium.—Narcotic, sedative, anodyne, antispasmodic. Horse, ½ to 2 drachms; ox, 2 to 4 drachms; sheep, 10 to 20 grains.

Pepper, black.—Stomachic, stimulant. Horse, 2 drachms; ox, 3 drachms; sheep, 1 to 2 scruples.

Peppermint.—30 to 60 drops.

Pumpkin seeds.—Vermifuge, tæniafuge (tape-worm medicine). Horse, 1 pint.

Rhubarb.—Laxative, tonic. Horse, 1 ounce; ox, 2 ounces; sheep, 1 drachm.

Rosin.—Diuretic. Horse, 2 drachms; ox, ½ to 1 ounce; sheep, 2 to 4 drachms.

Soap.—Diuretic, antacid, laxative. Horse, ½ ounce; sheep, 2 to 6 drachms.

Sweet spirits of nitre.—Stimulant, antispasmodic, diuretic, diaphoretic. Horse, 1 to 2 ounces; ox, 3 to 4 ounces; sheep, 3 to 6 drachms.

Tobacco.—Sedative, antispasmodic, vermifuge. Horse, 4 drachms; ox, 4 to 6 drachms; sheep, 1 drachm.

Tar.—Expectorant, antiseptic. Horse, ½ to 1 ounce; ox, ½ to 2 ounces; sheep, ½ ounce.

Turpentine, oil of.—Stimulant, antispasmodic, diuretic. Horse, 1 to 2 ounces; ox, 1 to 1½ ounces; sheep, 1 to 2 drachms. Vermifuge: Horse, 2 ounces; ox, 2 to 3 ounces; sheep, 4 drachms.

Valerian.—Diffusible stimulant, antispasmodic, vermifuge. Horse, 2 ounces; ox, 2 to 4 ounces; sheep, ½ ounce.

Zinc, sulphate of.—Astringent, tonic. Horse, ½ drachm; ox, 2 to 3 drachms; sheep, 15 to 30 grains.

V. When and How Often may the Dose be Repeated?

The graduation of doses, according to age, condition, etc., has been

explained on page 238. We add the following *general* directions for the reader's guidance in repeating the dose.

Alteratives.—Give twice or thrice daily.

Anodynes.—Four hours apart till they effect their object.

Anti-spasmodics.—Same as anodynes.

Diaphoretics.—Same as alteratives.

Diuretics.—Two to four hours apart, according to urgency of the case.

Emetics.—These are not given to the horse, his anatomy being such that vomiting is not possible. For other animals, repeat every five or ten minutes, assisting their action by opening the mouth and irritating the throat with a feather.

Febrifuges.—Two to four times daily.

Narcotics.—Four hours apart till the desired effect is produced.

Purgatives.—As these are usually very powerful, overdosing must be guarded against, by waiting till the first dose has had full time to operate. This will be not less than thirty-six hours for the horse; twelve to fifteen hours for sheep and cattle; and seven to ten hours for hogs. Draughts of lukewarm water, or of warm gruel, hasten the action of purgatives.

Refrigerants.—Twice or thrice daily.

Sedatives.—Every four hours, as long as necessary.

Stimulants.—Four hours apart till the desired effect is produced.

Tonics.—Twice or three times daily.

VI. Simple Directions for Preparing and Using Medicines.

Balls.—Made of drugs (in powdered form) mixed with honey or molasses and linseed meal to about the stiffness of dough, and then wrapped in tissue paper, oiled for greater ease in swallowing. Care must be taken not to make it too large. A little thicker than a man's thumb will be right for horses and cattle. The ball must not be round, but cylindrical in shape, as shown in the cuts given in Chapter XXI, of this Part.

Drenches.—Made, when the remedial agent is itself not a liquid, either as decoctions or as infusions. The latter are made with either cold or hot water. Small quanties of powdered drugs can be mixed with thick gruel or mucilage, and given as a drench. Directions for giving drenches will be found on pages 239 and 448. Care must be taken to thoroughly dilute strong irritating liquids, so that if held in the animal's mouth for as much as five minutes, it will do no harm. There are some liquids of this class, as oil of turpentine, croton oil, etc., that will not mix with water, and hence should be prepared with olive or linseed oil, or milk beaten with eggs; or, in some cases, they may be given in mucilage.

Hypodermic injections.—From the rapidly increasing use of these expedients by physicians, there seems to be a growing disposition to

employ them in veterinary practice also. They can only be administered with a hypodermic syringe, and, as a rule, ought not to be resorted to without the advice of a competent surgeon.

Injections or Enemas.—These are not at all difficult to give, especially if one has a regular horse syringe. Patent injectors that pump in the liquid continuously are in the market. (See article "Syringe," in Section I, this chapter.)

VII. Weights and Measures.

In compounding drugs it is necessary to be very exact as to weights and measures. The druggist, with his delicate scales and expertness in manipulation, is the best person to put up your veterinary prescription, if it is otherwise convenient to have him do so. Frequently this is not the case, however, and we therefore recommend farmers to provide themselves (as can be done at small expense) with a pair of scales and a measuring glass for liquids. The weights for the former should be according to what is called apothecaries' weight, instead of avoirdupois, while the glass will be already marked according to wine measure, so called.

TABLE OF APOTHECARIES' WEIGHT.	TABLE OF WINE MEASURE.
20 grains make one scruple,	60 minims, or drops, make one drachm,
3 scruples make one drachm,	8 drachms make one ounce,
8 drachms make one ounce,	16 ounces make one pint,
12 ounces make one pound,	2 pints make one quart,
	4 quarts make one gallon.

Sufficient accuracy in fluid measure for anything not violent in its action, will be the following:

60 drops, or 1 tea-spoonful, make 1 drachm,
4 tea-spoonfuls, or 1 table-spoonful, make ½ ounce,
2 table-spoonfuls make 1 ounce,
1 wine-glassful makes 2 ounces,
1 tea-cupful makes 5 ounces,
1 tumblerful makes ½ pint.
1 tin-cupful (commonest size) makes 1 pint.

A handful of flaxseed, or other seeds usually innocent in their nature, will weigh about 2 ounces; a handful of leaves or dried herbs will weigh about 1 ounce.

CHAPTER XXVI.

RECIPES FOR THE HORSE.

As a matter of convenience to the reader, to whom time will often be precious in treating his sick stock, we add this chapter, resuming all our prescriptions for the horse.

No. 1. LOTION FOR FISTULA.

Sulphate of copper, 2 drachms,
Water, ½ pint,
Mix.
Inject once or twice a day.

No. 2. LOTION FOR FISTULA.

Sulphate of zinc, 3 drachms,
Water, ½ pint,
Mix.
Inject once or twice a day.

No. 3. LOTION FOR FISTULA.

Corrosive sublimate, 1 drachm,
Water, ½ pint,
Mix.
Inject once or twice a day.

No. 4. FEVER MIXTURE.

Sweet spirits nitre, 1 ounce,
Tincture aconite root, 1 drachm,
Nitrate of potash, 1 ounce,
Water, ½ pint,
Mix.
Give a tablespoonful every 2 hours.

No. 5. CARBOLIC LOTION.

Carbolic acid, 1 part,
Water, 30 parts,
Mix.
Inject three times a day.

No. 6. CARBOLIC LOTION.

Carbolic acid, ½ ounce,
Water, 1 pint,
Mix.
Use three or four times a day.

No. 7. WHITE LOTION FOR FLESH WOUNDS.

Sulphate of zinc, 6 drachms,
Sugar of lead, 1 ounce,
Water, 1 pint,
Mix and shake.
Apply three times a day.

No. 8. HOOF OINTMENT.

Pine tar, 4 fluid ounces,
Whale oil, 4 ounces,
(If too thin in warm weather, add mutton tallow, 2 ounces),
Mix.
Apply once a day.

No. 9. FLY BLISTER.

Powdered cantharides, ½ ounce,
Lard, 2 ounces,
Mix.
Rub well in.

No. 10. RED MERCURIAL BLISTER.

Biniodide of mercury, 2 drachms,
Lard, 2 ounces,
Mix.
Rub well in.

No. 11. COMPOUND LINIMENT.

Tincture of iodine, 3 ounces,
Aqua ammonia, 1 ounce,
Oil of turpentine, 1 ounce,
Glycerine, 1 ounce,
Mix.
Rub well in twice a day.

No. 12. COOLING LOTION.

Muriate of ammonia, 1 ounce,
Nitrate of potash, 1 ounce,
Water, 1 quart,
Mix.
Apply three times a day.

No. 13. COOLING LOTION.

Vinegar (strong), 1 pint,
Common salt, a handful,
Water, 1 pint,
Mix.
Apply three or four times a day.

No. 14. LINIMENT FOR SPRAINS.

Liquor ammonia, 1 ounce,
Tincture arnica, 1 ounce,
Tincture opium, 1 ounce,
Oil turpentine, 1 ounce,
Alcohol, 1 ounce,
Water to make 1 pint,
Mix.
Rub well in twice a day.

No. 15. LINIMENT FOR SPRAINS.

Tincture arnica, 1½ ounces.
Tincture of opium, 1 ounce,
Liquor ammonia, 1½ ounces,
Water to make 1 pint,
Mix.
Rub well in twice a day.

No. 16. DIURETIC POWDER.

Rosin, 2 ounces,
Nitrate of potash, 2 ounces.
Powder and mix.
Divide into twelve powders, and give one night and morning in soft feed.

No. 17. IODINE LOTION.

Iodine, 1 drachm,
Iodide of potash, 1 drachm,
Alcohol, 1 ounce,
Water to make 1 pint,
Mix.
Inject twice a day.

No. 18. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Fluid extract belladonna, 2 drachms,
Sweet spirits nitre, 2 ounces,
Carbonate of ammonia, 1 ounce,
Nitrate of potash, 1 ounce,
Water to make 1 pint,
Mix.
Give a tablespoonful every 2 hours.

No. 19. PASTE FOR OPEN JOINT.

Carbolic acid, 1 drachm,
Glycerine, 2 drachms,
Flour, enough to make a paste,
Mix.
Make a paste, and apply to the cut twice a day.

No. 20. TONIC POWDER.

Sulphate of iron, 2 ounces,
Cinchona bark, 2 ounces.
Powder and mix.
Divide into twelve powders, and give one night and morning in the feed.

No. 21. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Sweet spirits nitre, 1½ ounces,
Nitrate of potash, 1½ ounces,
Water to make 1 pint,
Mix.
Give a tablespoonful every two hours.

No. 22. TONIC POWDER.

Sulphate of iron, 1½ ounces,
Nitrate of potash, 2 ounces.
Powder and mix.
Divide into twelve powders, and give one night and morning in soft feed.

No. 23. PURGATIVE BALL.

Barbadoes aloes, 5 drachms,
Ginger, 1 drachm,
Gentian root, 1 drachm,
Syrup or soap, enough to combine foregoing.
Powder and mix.
Make a ball, and give as one dose.

No. 24. ASTRINGENT WASH.

Sugar of lead, 1 ounce,
Water, 1 pint,
Mix.
Apply three times a day.

No. 25. LOTION FOR BRUISE.

Tincture of arnica, 1 ounce,
Laudanum, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day, and bandage.

No. 26. ACID LOTION.

Hydrochloric acid, ½ ounce,
Water, 1 pint,
Mix.
Apply twice a day.

No. 27. LOTION (ANODYNE.)

Tincture of arnica, 1 ounce,
Tincture of opium, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day without a bandage.

No. 28. LOTION FOR ULCERATED BONE.

Hydrochloric acid, 2 drachms,
Water, ½ pint,
Mix.
Apply twice a day.

No. 29. STRONG CARBOLIC LOTION.

Carbolic acid, ½ ounce,
Linseed oil, ¾ pint,
Mix.
Apply three times a day.

No. 30. FEVER MIXTURE.

Tincture aconite root, 1 drachm,
Fluid extract belladona, 2 drachms,
Water, 4 ounces,
Mix.
Give a tablespoonful every 2 hours.

No. 31. ABSORBING OINTMENT.

Iodide of potash, 2 drachms,
Lard, 2 ounces,
Mix.
Apply once a day with friction.

No. 32. TANNIC LOTION.

Tannic acid, ½ ounce,
Vinegar, 1 ounce,
Water, 1 quart,
Mix.
Apply three times a day.

No. 33. DIURETIC POWDER.

Rosin, 2 ounces,
Nitrate of potash, 2 ounces,
Linseed meal, 2 ounces,
Powder and mix.
Give a tablespoonful morning and night in the feed.

No. 34. TONIC POWDER.

Sulphate of iron, 1½ ounces,
Nitrate of potash, 1 ounce,
Fenugreek seed, 2 drachms,
Linseed meal, 2 ounces,
Powder and mix.
Give a tablespoonful morning and night in the feed.

No. 35. TONIC MIXTURE.

Tincture of iron, 1 ounce,
Tincture of gentian, 1 ounce,
Water, 10 ounces,
Mix.
Give two tablespoonfuls three times a day.

No. 36. POWDER FOR RHEUMATISM.

Colchicum seed (powdered), 1 ounce,
Nitrate of potash, 1 ounce,
Fenugreek seed, 2 drachms,
Mix.
Divide into twelve powders, and give one night and morning in soft feed.

No. 37. ALTERATIVE COMPOUND.

Epsom salts, 4 ounces,
Nitrate of potash, 2 ounces,
Linseed meal, 4 ounces,
Mix.
Give a tablespoonful twice a day in soft feed.

No. 38. ALTERATIVE MIXTURE.

Potassium iodide, 2 ounces,
Water, 1 pint,
Mix.
Give a tablespoonful morning and night.

No. 39. CARBOLIC LOTION.

Carbolic acid, 2 drachms.
Water, 1 pint.
Mix.
Inject three times a day.

No. 40. FEVER MIXTURE.

Sweet spirits nitre, 1½ ounces,
Tincture aconite root, 1 drachm,
Fluid extract belladonna, 2 drachms,
Tincture gentian, 1 ounce,
Nitrate of potash, 1 ounce,
Muriate of ammonia, 1 ounce,
Water to make 1 pint,
Mix.
Give a wineglassful every two hours in bad cases, and three or four times a day in mild cases.

No. 41. AMMONIA BLISTER.

Liquor ammonia, 2 ounces,
Oil turpentine, 2 ounces,
Linseed oil, 2 ounces,
Mix.
Rub well in once a day till mildly blistered.

No. 42. POWDER FOR HEAVES.

Powdered lobelia seed, 2 ounces,
Linseed meal, 2 ounces,
Mix.
Divide into eight powders, and give one night and morning in soft feed; wait a week, and repeat.

No. 43. COUGH POWDER.

Gum camphor, 1½ ounces,
Powdered digitalis, 1 ounce,
Linseed meal, 2 ounces,
Mix.
Divide into twelve powders, and give one night and morning in soft feed.

No. 44. PROF. DICK'S COUGH RECIPE.

Gum camphor, 1 drachm,
Opium, 1 drachm,
Digitalis, 1 drachm,
Calomel, 1 drachm,
Mix.
Make a ball with syrup, and give as one dose, repeating once a day for a week; wait a week, and repeat.

No. 45. COUGH MIXTURE.

Prussic acid, dilute, 2 drachms,
Tincture of camphor, 1 ounce,
Fluid extract belladonna, 3 drachms.
Tincture gentian, 1 ounce,
Chlorate of potash, 1 ounce,
Water to make 1 pint,
Mix.
Give two tablespoonfuls three times a day, with a syringe.

No. 46. LOTION FOR SORE MOUTH.

Borax, 1 ounce,
Honey, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day.

No. 47. MIXTURE FOR FLATULENCE.

Bi-carbonate soda, 1 teaspoonful.
Ginger, 1 ounce,
Water, ½ pint,
Mix.
Give as one dose.

No. 48. A STRONG PURGATIVE.

Barbadoes aloes, 6 drachms,
Linseed oil, 1 pint,
Mix.
Give as one dose.

No. 49. STIMULATING MIXTURE.

Whiskey, 2 ounces,
Extract ginger, 1 ounce,
Water, ½ pint,
Mix.
Give as one dose.

No. 50. MIXTURE FOR COLIC.

Sweet spirits nitre, 1½ ounces,
Tincture opium, 1 ounce,
Extract ginger, ½ ounce,
Water, ½ pint,
Mix.
Give as one dose.

No. 51. MIXTURE FOR WIND COLIC.

Chloroform, ½ ounce,
Linseed oil, 1 quart,
Mix.
Give as one dose.

No. 52. ANODYNE MIXTURE.

Sulphate of morphia, 4 grains,
Water, ½ ounce,
Mix.
Give as one dose.

No. 53. MIXTURE FOR WIND COLIC.

Bi-carbonate soda, a tablespoonful,
Water, a teacupful,
Mix.
Give as one dose

No. 54. MIXTURE FOR WIND COLIC.

Oil turpentine, 1 ounce,
Linseed oil, ½ pint,
Tincture of opium, 1 ounce,
Mix.
Give as one dose.

No. 55. MIXTURE FOR WIND COLIC.

Chloroform, 1 ounce,
Linseed ojl, 1 pint,
Mix.
Give as one dose.

No. 56. MIXTURE FOR CONSTIPATION.

Linseed oil, 1 quart,
Tincture nux vomica, 1 ounce,
Mix.
Give as one dose.

No. 57. CROTON OIL LINIMENT.

Croton oil, 1 ounce,
Linseed oil, 3 ounces,
Mix.
Rub in well to the belly.

No. 58. MIXTURE FOR DIARRHŒA.

Prepared chalk, 1 ounce,
Ginger, 1 ounce,
Opium, 1 drachm,
Starch gruel, 1 pint,
Mix.
Give as one dose.

No. 59. ASTRINGENT MIXTURE.

Linseed oil, ½ pint,
Opium, 1 drachm,
Tincture catechu, 1 ounce,
Mix.
Give as one dose.

No. 60. ASTRINGENT MIXTURE.

Tincture catechu, 1 ounce,
Spirits of camphor, ½ ounce,
Tincture opium, 1 ounce,
Starch gruel, 1 quart,
Mix.
Give as one dose.

No. 61. ANODYNE INJECTION.

Tincture opium, 1 ounce,
Sulphuric ether, 1 ounce,
Starch, 1 quart,
Mix.
Give as injection.

No. 62. ANODYNE MIXTURE.

Bromide potassium, 8 ounces,
Water, 1 pint,
Mix.
Give two tablespoonfuls three times a day.

No. 63. MIXTURE FOR TETANUS.

Fluid extract belladonna, 2 ounces,
Prussic acid (dilute), 2 ounces,
Water to make 8 ounces,
Mix.
Give a tablespoonful three times a day.

No. 64. NERVE TONIC.

Nux vomica, 1 drachm,
Gentian root, powdered, 2 drachms,
Linseed meal, ½ ounce,
Mix.
Give as one dose. Repeat morning and night for a month.

No. 65. MIXTURE FOR SUNSTROKE.

Whiskey, 2 ounces,
Sweet spirits of nitre, ½ ounce,
Nitrate of potash, 1 drachm.
Water, 4 ounces,
Mix.
Give as one dose, and repeat as the case requires.

No. 66. ALTERATIVE AND TONIC.

Potassium iodide, 1 drachm,
Nux vomica, 1 drachm.
Fœnugreek seed, 1 drachm.
Mix.
Give as one dose, and repeat morning and night for three or four weeks.

No. 67. TONIC POWDER.

Nux vomica, 1 drachm.
Sulphate iron, 1 drachm,
Fœnugreek seed, 1 drachm,
Mix.
Give as one dose, and repeat morning and night for three or four weeks.

No. 68. TONIC FOR PURPURA.

Tincture muriate of iron, 1 ounce,
Tincture gentian, 1 ounce,
Water to make 4 ounces,
Mix.
Give a tablespoonful every 2 hours.

No. 69. MIXTURE FOR PURPURA.

Oil turpentine, 1 ounce,
Linseed oil to make 4 ounces,
Mix.
Give a tablespoonful every 2 hours.

No. 70. IRON LOTION.

Tincture muriate of iron, 1 ounce,
Water, ½ pint,
Mix.
Apply locally.

No. 71. BALL FOR DIABETES.

Iodine, 1 drachm,
Iodide potash, ½ drachm,
Linseed meal, enough to combine the foregoing.
Mix.
Make a ball and give as one dose.

No. 72. LEAD LOTION.

Sugar of lead, ½ ounce,
Vinegar, 1 ounce,
Water to make 1 quart,
Mix.
Inject a little once a day.

No. 73. SILVER LOTION.

Nitrate of silver, 15 grains,
Water, ½ pint.
Mix.
Inject a little twice a day.

No. 74. IODINE LOTION.

Iodine, 1 drachm,
Potash iodide, 1 drachm,
Water, ½ pint,
Mix.
Inject a little twice a day.

No. 75. ZINC LOTION.

Sulphate of zinc, 2 drachms,
Water, 1 pint,
Mix.
Inject twice a day.

No. 76. LEAD LOTION.

Sugar of lead, 3 drachms,
Water, 1 pint,
Mix.
Inject twice a day.

No. 77. CAMPHORATED OIL.

Gum camphor, 1 ounce,
Olive oil, ½ pint,
Mix.
Apply three times a day.

No. 78. COOLING MIXTURE.

Chlorate of potash, 2 ounces,
Water, 1 quart,
Mix.
Give four ounces three times a day.

No. 79. ALTERATIVE MIXTURE.

Iodide of potash, 1 drachm,
Water, ½ pint,
Mix.
Give as one dose, repeating three times a day.

No. 80. EYE LOTION.

Atropin sulphate, 2 grains,
Water, 1 ounce,
Mix.
Apply four or six times a day.

No. 81. EYE LOTION.

Nitrate of silver, 5 grains,
Water, 1 ounce,
Mix.
Apply twice a day.

No. 82. EYE LOTION.

Nitrate of silver, 10 grains,
Water, 1 ounce,
Mix.
Apply twice a day.

No. 83. WORM POWDER.

Sulphate of iron, 1 drachm,
Tartar emetic, 1 drachm,
Linseed meal, 2 drachms,
Mix.
Give as one dose. Repeat morning and night for a week, and follow it with No. 84.

No. 84. WORM DRENCH.

Oil turpentine, 1 ounce,
Linseed oil, 1 pint,
Mix.
Give as one dose.

No. 85. LOTION FOR LICE.

Tobacco, 2 pounds,
Water, 3 gallons,
Mix.
Steep, and wash the animal.

No. 86. LOTION FOR LICE.

Quassia chips, 3 pounds,
Water, 1 gallon,
Mix.
Steep one hour, and wash the animal.

No. 87. OINTMENT FOR MANGE.

Sulphur, 4 ounces,
Oil of tar, 2 ounces,
Linseed oil, ½ pint,
Mix.
Rub well in once a day to all affected spots.

No. 88. CORROSIVE SUBLIMATE WASH.

Corrosive sublimate, 40 grains,
Water, 1 pint,
Apply once a day till cured.

No. 89. ANTACID POWDER.

Bi-carbonate of soda, 2 ounces,
Powdered gentian, 1 ounce,
Linseed meal, 2 ounces,
Mix.
Give a tablespoonful morning and night in soft feed.

No. 90. MIXTURE FOR SNAKE BITES, ETC.

Aqua ammonia, 1 teaspoonful.
Whiskey, 1 pint,
Water, (warm), ½ pint,
Give as one dose. Repeat every hour, but reducing the quantity of whiskey one-half, till the animal is evidently out of danger.

AMONG THE CATTLE.

PART III.

CATTLE.

HISTORY, MANAGEMENT AND CHARACTERISTICS OF THE VARIOUS BREEDS.

CATTLE.

CHAPTER I.

EARLY HISTORY AND TYPICAL BREEDS OF CATTLE.

I. WILD AND SEMI-WILD HERDS.—II. THE FIRST CHRONICLERS AND BREEDERS OF CATTLE.—III. THE ORIGINAL TYPE.—IV. UNDOMESTICATED HERDS OF EUROPE AND ASIA.—V. SPANISH AMERICAN BREEDS.—VI. THE DEVONS.—VII. THE HEREFORDS.—VIII. THE DURHAM OR TEESWATER BREED.—IX. IRISH CATTLE.—X. SCOTCH AND HIGHLAND CATTLE.—XI. SWISS CATTLE.—XII. DUTCH CATTLE.—XIII. FOSSIL CATTLE.—XIV. THE WILD CATTLE OF ENGLAND.—XV. NATIVE DISTRICTS OF SOME BREEDS.

I. Wild and Semi-Wild Herds.

Where horned cattle first existed in a wild state is utterly unknown, and their origin is equally uncertain. There are a number of species of the same genus—the genus *Bos*—existing in a wild state; such as the Bison, misnamed Buffalo, of America, and the true Buffalo of Africa. There are, also, so-called wild cattle which roam in vast herds in North and South America, and in some parts of Europe and Asia. These, however, as well as all others of the genus *Bos Taurus*, to which our present domesticated cattle belong, are, when found wild, the descendants of animals which escaped from the control of man at some period, more or less remote.

II. The first Chroniclers and Breeders of Cattle.

Jubal, the son of Lamech, who lived in the time of Adam, is recorded in Scripture as being "the father of such as have cattle." Still, it cannot be assumed that Jubal's cattle were in any way identical with the domestic ox of later times, for the word "cattle" is used by the early Scriptural writers to denote nearly all grazing animals, including sheep and goats. Job, however, who lived more than two thousand years before Christ, is distinctly spoken of as the possessor of one thousand yokes of oxen. Homer, eighteen hundred years before the Christian era, wrote celebrating the noble bullocks, with golden knobs on the tips of their horns, and he minutely describes the manner of fastening the knobs. Juno, among the pagan goddesses, is called ox-eyed, from the clearness and liquid expression of those features. Jeremiah, sixty-two years before

Christ, speaks of a "fair heifer:" and Virgil, about the time of the Christian era, wrote admiringly of the beautiful cattle of the Roman Campagnas, and of their value in husbandry.

The Egyptians worshipped the bull Apis, and, it is probable that they were the first to domesticate the ox. That the domestication of horned cattle was anterior to that of the horse is more than probable.

III. The Original Type.

What the first cattle were like is mainly a matter of conjecture. The Egyptian hieroglyphics, the most ancient known, leave us entirely in the dark as to what the cattle of that remote antiquity resembled. No description of the original type has come down to us. The earliest drawings, or pictures of cattle, represent them as being rugged in form, of great length, gaunt, and with upright, spreading horns, somewhat like the descendants of Spanish cattle now running wild in Central America.

IV. Undomesticated Herds of Europe and Asia.

The Steppes of Tartary still nourish vast droves of semi-wild cattle, that are not regularly herded, and are wild to all intents and purposes. In Hungary, also, and in Russia, and on the grassy plains of all the more temperate climates of Asia, herds of cattle abound that are as wild as neglect on the part of their owners can make them.

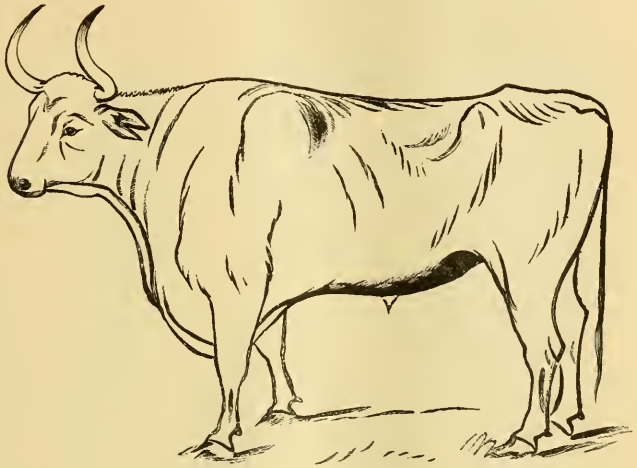
Cattle have been reared by every Celtic nation from the earliest period, and have been regarded by all barbarians and pagan people as the greatest of the divine gifts to man. The herds ran half-wild when ever these tribes migrated, until, as civilization advanced, the least desirable breeds were exterminated, while the fittest survived in a state of real domestication. Descendents of one of these ancient breeds, are still seen in the Chillingham cattle of England; they are wild only because all possible means are used to keep them so. The wildest and least frequented tracts of two extensive parks are set apart for their use. They are probably the descendents of the best of the ancient cattle of Great Britian.

V. Spanish-American Breeds.

In Texas and on the plains of Mexico, in Central America, and in the sub-tropical and more temperate regions of South America, there are immense herds of cattle, the descendents of animals which escaped from the early Spanish invaders. In Spain these fierce, almost untamable cattle are still bred for the barbarous sport witnessed in their bull-fighting arenas, where the animals are pitted against men on foot and on horseback, until they are tortured to death.

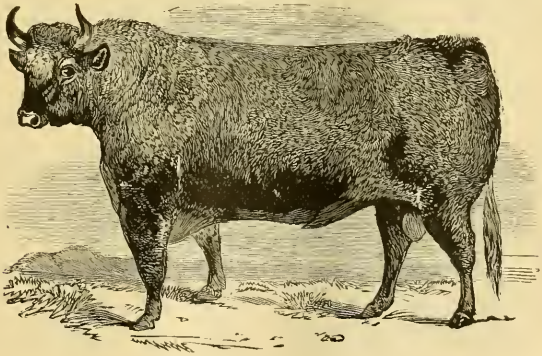
The cattle of Texas, and the Southwestern plains possess at least one good quality in a high degree—they reproduce rapidly, and take care of

themselves at small expense to their owners. Within the last twenty years large numbers of them have appeared in the markets of the West, where they have been slaughtered for export to Europe in various forms



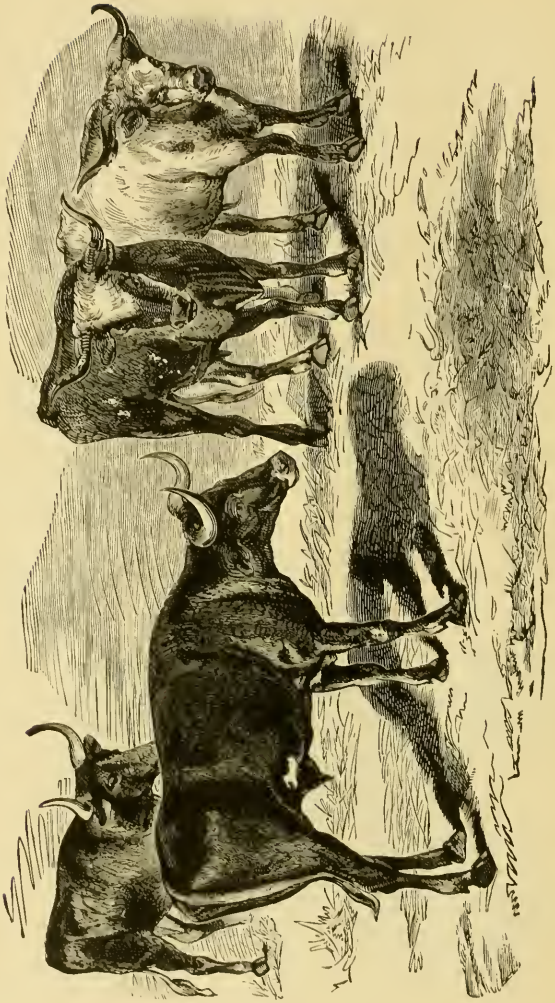
CENTRAL AMERICAN OX.

of cured beef. When well-fattened, their beef is excellent, and its abundance furnishes an unfailing supply of cheap food. They are fast



DEVON BULL OF FIFTY YEARS AGO.

being modified by crossing improved stock upon them, and in a comparatively short time but few of the original type will be found, except in



CHEROKEE AND TEXAS CATTLE.

Central and South America, where modifications of the ancient breed may be long postponed.

VI. The Devons.

Among the oldest of the distinct breeds of England, the Devons have always been, as they now are, one of distinguished merit. They belong to the class called Middle-Horns—Irish long-horned cattle, and the Texans furnishing good types of the long-horned breeds, while the old cattle of Durham represent the Short-Horns. The Devons, as known 100 years ago, are thus described by Youatt, whose writings are our best authority on breeds of British cattle: "The north of Devon has been long celebrated for a breed of cattle beautiful in the highest degree, and, in activity at work and aptitude to fatten, unrivaled. The native country of the Devons, and where they are found in a state of the greatest purity, extends from the river Taw westward, skirting along the Bristol channel; the breed becoming more mixed, and at length comparatively lost before we arrive at the Parrett. Inland it extends by Barnstaple, South Molton, and Chumleigh, as far as Tiverton, and thence to Wellington, where again the breed becomes unfrequent, or it is mixed before we reach Taunton. More eastward the Somersets and the Welsh mingle with it, or supersede it. To the south there prevails a larger variety, a cross probably of the Devon with the Somerset; and on the west the Cornish cattle are found, or contaminate the breed. The Devonshire man confines them within a narrow district, and will scarcely allow them to be found with purity beyond his native county. From Portlock to Biddeford, and a little to the north and the south, is, in his mind, the peculiar and only residence of the true Devon.

"From the earliest records the breed has here remained the same; or if not quite as perfect as at the present moment, yet altered in no essential point until within the last thirty years. This is not a little surprising when it is remembered that a considerable part of this district is not a breeding country, and that even a proportion, and that not a small one, of Devonshire cattle, are bred out of the county. On the borders of Somerset and Dorset, and partly in both, extending southward from Crewkern, the country assumes the form of an extensive valley, and principally supplies the Exeter market with calves. Those that are dropped in February and March, are kept until May, and then sold to the drovers, who convey them to Exeter. They are there purchased by the Devonshire farmers, who keep them for two or three years, when they are sold to the Somersetshire graziers, who fatten them for the London market; so that a portion of the Devons, and of the very finest of the breed, come from Somerset and Dorset."

The illustration on page 493 will give an idea of the excellence of these cattle, even fifty years ago. Since that time they have been much improved and only lack size to cause them to be more generally bred in the great grazing districts of the United States.

VII. The Herefords.

The Herefords are Middle-Horns, and have many of the characteristics of the Devons to which they are, without doubt, allied. They have long been known and highly esteemed in England. Within the last thirty years they have been bred to such perfection that they compete with the Short-Horns in the prize fairs of England and the United States, and carry off honors with the best of them. Of this breed, as they were known in the early part of the century, Youatt says: "The Hereford white-faced breed, with the exception of a very few Alderney and Durham cows, have almost exclusive possession of the county of Hereford. The Hereford oxen are considerably larger than the Devons. They are usually of a darker red; some of them are brown, and even yellow, and a few are brindled; but they are principally distinguished by their white faces, throats and bellies. In a few the white extends to the shoulders. The old Herefords were brown or red-brown, with not a spot of white about them. It is only within the last fifty or sixty years that it has been the fashion to breed for white faces. Whatever may be thought of the change of color, the present breed is certainly far superior to the old one. The hide is considerably thicker than that of the Devon. Compared with the Devons, they are shorter in the leg, and also in the carcass; higher, and broader and heavier in the chine; rounder and wider across the hips, and better covered with fat; the thigh fuller and more muscular, and the shoulders larger and coarser.

"If it were not for the white face, and somewhat larger head and thicker neck, it would not at all times be easy to distinguish between a heavy Devon and a light Hereford. Their white faces may probably be traced to a cross with their not distant relations, the Montgomeries.

"The Hereford cow is apparently a very inferior animal. Not only is she no milker, but even her form has been sacrificed by the breeder. Hence the Hereford cow is comparatively small and delicate, and some would call her ill-made. She is very light-fleshed when in common condition, and beyond that, while she is breeding, she is not suffered to proceed; but when she is actually put up for fattening, she spreads out, and accumulates fat at a most extraordinary rate."

The illustration on page 497 is a good picture of the Hereford cow of twenty years ago. The reader would scarcely recognize the Hereford of 1881 as the same breed described by Youatt, so much have they been improved.

HEREFORD COW AND CALF OF TWENTY YEARS AGO.

VIII. The Durham or Teeswater Breed.

This breed, which has become famous as the original of the celebrated Short-Horn cattle of to-day, is a mixed race, though it has been a distinctive English breed for hundreds of years past. The Rev. Mr. Berry, author of a much-criticized history of Short-Horn cattle, written in the early part of the century, but undoubtedly correct in relation to their early history, says:

"From the earliest periods as to which we have any accounts of our breeds of cattle, the counties of Durham and York have been celebrated for their Short-Horns, but principally, in the first instance, on account of their reputation as extraordinary milkers. It may be the best evidence, that, as a breed, they have never in this particular been equaled. They were generally of large size, thin-skinned, sleek-haired, bad handlers, rather delicate in constitution, coarse in the offal, and strikingly defective in girth in the fore-quarters. When put to fatten, they were found slow feeders; producing an inferior meat, not marbled or mixed fat and lean, and in some cases the lean was found a particularly dark hue.

"A period of more than one hundred years has now elapsed since the Short-Horns, on the banks of the river Tees, hence called the Teeswater breed, assumed a very different character to the foregoing description. In color, they resembled the Short-Horns of the present day, being occasionally red, red and white, and roan, though the last not then so prevalent as now. They possessed a fine mellow skin and flesh, good hair, and light offal, particularly wide carcasses, and fore-quarters of extraordinary depth and capacity. When slaughtered, their proof was extaordinary, and many instances are recorded of the wonderful weight of their inside fat.

"The remarkable merit which existed in the Teeswater may, with propriety, be ascribed to a spirit of improvement which had some time manifested itself among the breeders on the banks of the Tees, whose laudable efforts were well seconded by the very superior land in the vicinity of that river. No doubt can be entertained that they proceeded on a judicious system of crossing with other breeds, because it was utterly impossible to raise such a stock as the Teeswater from pure Short-Horn blood. One cross to which they referred was, in all probability, the white wild breed; and if this conjecture be well-founded, it will be apparent whence the Short-Horns derived a color so prevalent among them.

"It is also asserted that, about the period in question, Sir William St. Quintin, of Scampston, imported bulls and cows from Holland, which were crossed with the stock of the country. It would tend to little advantage to conjecture as to what other breeds were resorted to, if any:

DURHAM OR TEESWATER BULL AND COW.

this much is certain, that great improvement was soon manifested, and a valuable variety established."

An illustration of this valuable breed, as it was known fifty years ago, is given on page 499. It is to be regretted that the fine milking qualities of their descendants should have been almost entirely bred out, and are now only found occasionally, through heredity, and this in but a very few families.

IX. Irish Cattle.

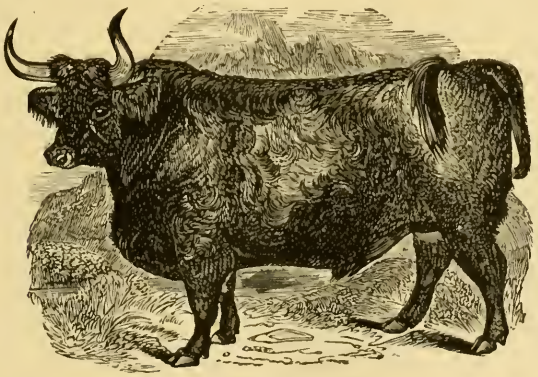
The cattle of Ireland are of two distinctive breeds, the Long-Horns and the Middle-Horns. Whence the Long-Horns came seems not to be known, since ancient records are silent upon the subject. Both in England and Ireland they can be traced far back. By some excellent authorities it is maintained that the Long-Horns originated in Ireland; but in Lancashire, England, also, long-horned cattle have existed since a remote antiquity.

The Irish Middle-Horns seem to have been an original breed, since they were found in all the hill and mountain regions, in almost every district. Mr. Youatt says of them that they are small, light, active and wild. The head is small, although there are exceptions to this in various parts; and so numerous, indeed, are those exceptions, that some describe the native Irish cattle as having thick heads and necks; the horns are short compared with the other breed, all of them fine, some of them rather upright, and frequently, after projecting forward, then turning backward. Although somewhat deficient in the hind-quarters, they are high-boned, and wide over the hips, yet the bone generally is not heavy. The hair is coarse and long; they are black, brindled and black, or brindled with white faces. Some are finer in the bone, and finer in the neck, with a good eye, a sharp muzzle, and great activity. They are exceedingly hardy; they live through the winter, and sometimes fatten, on their native mountains and moors; and when removed to a better climate and soil, they fatten with all the rapidity of the aboriginal cattle of the Highlands and Wales. They are generally very good milkers, and many of them are excellent. The cow of Kerry is said to be a favorable specimen of them.

X. Scotch and Highland Cattle.

Scotland has always been celebrated for its cattle, and for none more than its polled or horuless cattle. The Highland breeds are of great antiquity. The most celebrated of the polled breeds are the Galloways, originally said to have been middle-horned cattle. They are widely disseminated in England and the United States, and in their improved forms are regarded with much favor. Many sub-families are now known.

They are described as having been straight and broad in the back, and nearly level from the head to the rump; round in the ribs, and also, between the shoulders and ribs, and the ribs and loins. The loins were broad, and without large projecting hip (hook) bones. In the early part of the century they were described by the Rev. Mr. Smith, author of a "Survey of Galloway," as being short in the leg, and moderately fine in the shank bones—the happy medium preserved in the leg, which secures hardihood and disposition to fatten. With the same cleanness and shortness of shanks, there was no breed so large and muscular above the knee. Clean, not fine and slender, but well proportioned in the neck and chaps; broad shoulders, deep chest, and close, compact form. The neck of the Galloway bull was, and still is, thick almost to a fault. The head rather heavy; the eyes not prominent, and the ears large, rough, and full of long hairs on the inside. The Galloway was covered with a loose mellow skin of medium thickness, clothed with long, soft, silky hair. The skin is thinner than that of the Leicestershire, but not so fine as the hide of the Short-Horn, but handling soft and kindly. The prevailing and fashionable color was black—a few dark brindle-brown, and still fewer speckled with white spots, and some of them a dun or drab color. Dark colors were, and are yet, uniformly preferred, from the belief that they indicate hardiness of constitution.



WEST HIGHLAND FEEDING OX.

Highland Cattle.—The West Highland cattle are an ancient breed and are found in all the mountain regions of Scotland and the Isles. Their great value consists in the eminent superiority of their flesh. They are hardy, and easily fed; in that they will live, and sometimes thrive, on the coarsest pastures; that they will frequently gain from a fourth to a

third of their original weight in six months' good feeding; that the proportion of offal is not greater than in the most improved larger breeds. They will lay their flesh and fat equably on the best parts; and, when fat, the beef is close and fine in the grain, highly flavored, and so well mixed or marbled, that it commands a superior price in every market.

The principal old breeds of Scotland, as given by Youatt, may be summarized as follows: Scotland contains several distinct and valuable breeds of cattle, evidently belonging to our present division, the Middle-Horns. The West Highlanders, whether we regard those that are found in the Hebrides, or the county of Argyle, seem to retain the most of the aboriginal character. They have remained unchanged, or improved only by selection, for many generations; indeed from the earliest accounts that we possess of Scottish cattle. The North Highlanders are a smaller, coarser, and in every way inferior race, and owe the greater part of what is valuable about them to crosses from the Western breed. The Northeastern cattle were derived from, and bear resemblance to the West Highlander, but are of considerably larger size. The Ayrshire breed is second to none for milking. The Galloways, which less than two hundred years ago, were middle-horned, and with difficulty distinguished from the West Highlanders, are now a polled breed—increased in size, with more striking resemblance to their kindred, the Devons—with all their aptitude to fatten, and with a great hardiness of constitution.

XI. Swiss Cattle.

The Swiss have long had a valuable breed of milking cattle which of late years has attracted some attention in the United States. In France they are held in high repute. A careful and accurate observer describes them as being robust, hardy animals, usually of a dun color or dun and white, with medium heads, hanging dewlaps, rather coarse shoulders and broad hips and quarters, with well developed udders. Removed from their native mountains they are said to manifest little impatience at the change, and though kept in stables and soiled, they seemed to thrive and carry a good coat of flesh; when dry, they fatten readily. In Switzerland they are wintered in the valleys, on the coarsest food, and as soon as the snow melts from the southern slopes of the mountains are driven to their pastures, which, as the season advances, are gradually changed for the higher ranges. For four months in the year they are kept on the most elevated feeding grounds, and there, attended by a single man, uniting in his person the offices of cowherd and dairyman, they feed on the close, sweet herbage, often at the very edge of the snow fields, till their short summer is over, and they are driven by the autumn storms to the more sheltered pastures again. Cheese is the chief product, and its

manufacture is conducted in the lonely chalet, perched on the mountain side, in the most primitive manner. The best cows yield from ten to twenty quarts of milk daily, and each cow produces by the end of the season of four months, on an average, 225 pounds of cheese.

XII. Dutch Cattle.

The Low Countries of Europe, Holland and the neighboring States, have, from a remote period, had a most valuable milking breed, that is now broken up into numerous varieties. The most noted of these are the Holstein or Friesian cattle, celebrated for the immense quantities of milk they give, and for their large frames, which take on fat and flesh kindly when dry. On page a young Holstein bull of the modern Chenery milking stock is represented. The late Mr. Klippart, when Secretary of the Ohio Board of Agriculture, wrote from personal observation of Holstein cattle, as follows: "The native cattle of Holstein are the Angle cattle, which are far more numerous than any other kind or race. They are small animals, with fine bones, short-legged rather than otherwise; a very fine, small head, and delicately formed neck. The predominating color is red or brown, but there are many dun, black, or spotted ones. According to the amount of food consumed, this race gives a more abundant supply of milk than any other in the Duchies. It is a very highly esteemed race and is much sought after for its milking qualities and kindliness in taking on flesh. The flesh is very fine, tender and juicy.

"In the marshes is found a race of cattle much larger and heavier than the Angles, larger-boned, and of a dark, reddish-brown, and known as the Marsh race. This race seems to be adapted to the marshes, but does not do well on the higher and dryer uplands. Upon the rich pastures of the marshes, for a time after calving, the best cows will give from forty-eight to sixty-four pounds, (from six to eight gallons) of milk daily. But the milk is not near so rich as that of the Angles.

"In Schleswig, rather than in Holstein, are found many of the Jutland race of cattle. These have very fine bones, and are long in proportion to their height, and are, as a rule, short-legged. The prevailing color is gray, black, or gray and black mixed with white, but very rarely red or brown. This race is more highly esteemed for its early maturity and readiness to fatten than for its milking qualities."

XIII. Fossil Cattle.

The original type of the modern ox is said to have been the Urus. Ancient legends have thrown around him mysterious qualities. He was described as being an animal of great fierceness and enormous size; but despite these fabled attributes, the Urus probably did not

compare better in size with the modern ox, than did the ancient horse, or our modern semi-wild horses, with the great draft horse of to-day.

That there once existed species of cattle in some pre-historic age, monstrous as compared with ours, there is no doubt. Youatt, in his history of British cattle, says that in almost every part of the Continent, and in every district of England, skulls, evidently belonging to cattle, have been found, far exceeding in bulk any now known. There is a fine specimen in the British Museum: the peculiarity of the horns, resembles smaller ones dug up in the mines of Cornwall, preserved, in some degree, in the wild cattle of Chillingham Park, and not quite lost in the native breeds of Devon and East Sussex, and those of the Welsh mountains and the Highlands.

XIV. The Wild Cattle of England.

Of the wild cattle kept in England on the estates of the Duke of Hamilton, and the Earl of Tankerville, known in his day, the same authority says:

"The wild breed, from being untamable, can only be kept within walls, or good fences; consequently, very few of them are now to be met with, except in the parks of some gentlemen, who keep them for ornament, and as a curiosity. Their color is invariably white, muzzle black; the whole of the inside of the ear, and about one-third of the outside, from the tips downward, red; horns, white, with black tips, very fine, and bent upward; some of the bulls have a thin, upright mane, about an inch and a half or two inches long. The weight of the oxen is from thirty-five to forty-five stone, and the cows from twenty-five to thirty-five stone, the four quarters (fourteen pound to the stone). The beef is finely marbled and of excellent flavor. The six year old oxen are generally very good beef; whence it may be fairly supposed that, in proper situations, they would feed well.

"At the first appearance of any person they set off in full gallop, and, at the distance of about two hundred yards, make a wheel round, and come boldly up again in a menacing manner; on a sudden they make a full stop at the distance of forty or fifty yards, looking wildly at the object of their surprise; but upon the least motion they all again turn round, and fly off with equal speed, but not to the same distance, forming a shorter circle, and again returning with a more threatening aspect than before; they approach probably within thirty yards, when they again make another stand, and then fly off; this they do several times, shortening their distance, and advancing nearer and nearer, till they come within such a short distance that most people think it prudent to leave them.

When the cows calve, they hide their calves for a week or ten days in some sequestered situation, and go and suckle them two or three times a day. If any person comes near the calves, they clap their heads close to the ground, to hide themselves; this is a proof of their native wildness. The dams allow no person to touch their calves, without attacking them with impetuous ferocity. When any one happens to be wounded, or is grown weak and feeble through age or sickness, the rest of the herd set on it and gore it to death."

The breeds now found in Great Britain, are almost as various as the soils of the different districts, and are purely artificial in their breeding, according to the several fancies of the originators, and successive breeders.

XV. Native Districts of Some Breeds.

The same careful authority, heretofore quoted, has divided them into Long-Horns, Short-Horns and Middle-Horns. Their history, which may be taken as correct, their classification, and their habits, as known in his day, are given as follows: "The Long-Horns were originally from Lancashire, much improved by Bakewell, and established through the greater part of the midland counties; the Short-Horns, mostly cultivated in the northern counties, and in Lincolnshire, and many of them found in every part of the kingdom where the farmer attends much to his dairy, or a large supply of milk is wanted; and the Middle-Horns, not derived from a mixture of the two preceding, but a distinct and valuable and beautiful breed, inhabiting principally the north of Devon, the east of Sussex, Herefordshire, and Gloucestershire; and, of diminished bulk, and with somewhat different character, the cattle of the Scottish and the Welsh mountains. The Alderney, with her crumpled horn, is found on the southern coast, and, in smaller numbers, in gentlemen's parks and pleasure-grounds every where; while the polled, or hornless cattle, prevail in Suffolk, and Norfolk, and in Galloway, whence they were first derived.

"These, however, have been intermingled in every possible way. They are found pure only in their native districts, or on the estates of some opulent and spirited individuals. Each county has its own mongrel breed, often difficult to be described, and not always to be traced—neglected enough, yet suited to the soil and to the climate; and, among little farmers, maintaining their station, in spite of attempts at improvements by the intermixture or the substitution of foreign varieties.

"The character of each important variety, and the relative value of each for breeding, grazing, the dairy, or the plough, will be considered before we inquire into the structure or general and medical treatment of cattle. Much dispute has arisen as to the original breed of British cattle.

The battle has been stoutly fought between the advocates of the Middle and the Long-Horns. The Short-Horns and the polls can have no claim; the latter, although it has existed in certain districts from time immemorial, was probably an accidental variety. We are very much disposed to adjudge the honor to the Middle-Horns. The Long-Horns are evidently of Irish extraction.

"Britain has shared the fate of other nations, and oftener than they, has been overrun and subjugated by invaders. As the natives retreated, they carried with them some portion of their property, which, in those early times, consisted principally in cattle. They drove along with them as many as they could, when they retired to the fortresses of north Devon and Cornwall, or the mountainous regions of Wales, or when they took refuge in the wealds of east Sussex; and there, retaining all their prejudices, customs and manners, were jealous of the preservation of that which reminded them of their native country before it yielded to a foreign yoke.

"In this manner was preserved the ancient breed of British cattle. Difference of climate wrought some change, particularly in their bulk. The rich pasture of Sussex fattened the ox into its superior size and weight. The plentiful, but not so luxuriant, herbage of the north of Devon, produced a smaller and more active animal, while the privations of Wales lessened the bulk and thickened the hide of the Welsh runt. As for Scotland, it set its invaders at defiance; or its inhabitants retreated for a while, and soon turned again on their pursuers. They were proud of their country, their cattle, their choicest possession; and there, too, the cattle were preserved, unmixed and undegenerated.

"Thence it resulted that in Devon, in Sussex, in Wales, and in Scotland, the cattle have been the same from time immemorial; while in all the eastern coast, and through every district of England, the breed of cattle degenerated, or lost its original character; it consisted of animals brought from every neighboring and some remote districts, mingled in every possible variety, yet conforming itself to the soil and the climate.

"Observations will convince us that the cattle in Devonshire, Sussex, Wales, and Scotland, are essentially the same. They are middle-horned; not extraordinary milkers, and remarkable for the quality rather than the quantity of their milk; active at work, and with an unequaled aptitude to fatten. They have all the characters of the same breed, changed by soil, climate, and time, yet little changed by man. We may almost trace the color, namely, the red of the Devon, the Sussex, and the Hereford; and where the black alone are now found, the memory of the red prevails. Every one who has compared the Devon cattle with the wild breed of Chatelherault park, or Chillingham castle, has been struck with the

great resemblance in many points, notwithstanding the difference of color, while they bear no likeness at all to the cattle of the neighboring country."

For these reasons Mr. Youatt considers the Middle-Horns to be the native breed of Great Britain.

CHAPTER II.

STRUCTURE OF THE OX.

I. COMPARATIVE DESCRIPTION.——II. A GOOD COW DESCRIBED IN VERSE.——III. SKELETON OF THE OX.——IV. ANALYSING THE HEAD.——V. EXTERNAL PARTS OF A FAT OX.——VI. TEETH OF THE OX.——VII. AGE OF CATTLE TOLD BY THE CHART.

I. Comparative Description.

The ox, like the horse, is made up of a bony structure, upon which rests the muscular and fleshy covering, and over this again lies the skin. The only means of defense possessed by cattle are their horns, which, in breeds that have been running wild for generations, develop into long sharp, and most formidable weapons. These are most securely fixed and rendered effective by the expanse of the frontal bone, shown at numeral 6, skeleton of the ox, as represented in the cut accompanying this chapter.

The horse is long in the limbs and neck; the ox is comparatively short in these members. The body of the horse corresponds to the square; that of the ox to the rectangle. The illustrations showing outlines of fat bullocks, as presented a few pages further on in this chapter—four forms exhibited—are accurate representations. The ribs of the ox are both longer and larger than those of the horse, since the several stomachs and the bowels of the ox are more capacious. The width of the bosom gives ample space for the fore legs and for the viscera; and this width is carried correspondingly behind, giving, in the modern ox, a broad loin and massive rump and hind quarters, where the choice parts of the beef lie.

II. A good Cow described in verse.

The physical proportions of the cow have been so accurately described in verse, by an old English writer, that we reproduce his stanzas as embodying the general characteristics of what goes to make up a perfect animal:

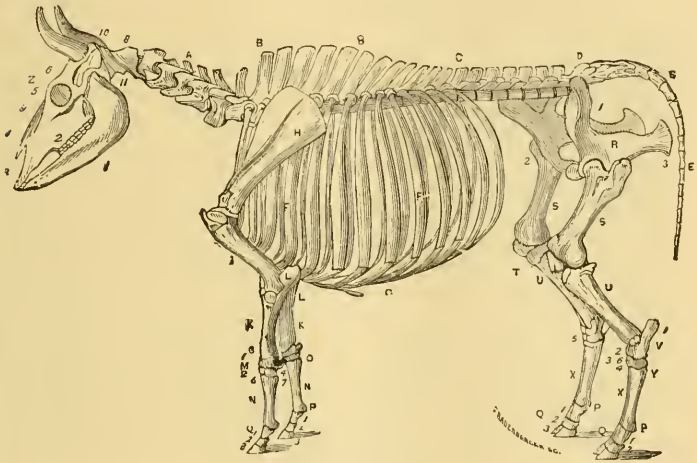
She's long in her face, she's fine in her horn,
She'll quickly get fat without cake or corn;
She's clean in her jaws, and full in her chine,
She's heavy in flank, and wide in her loin.

She's broad in her ribs, and long in her rump;
A straight and flat back, without e'er a hump;
She's wide in her hips, and calm in her eyes;
She's fine in her shoulders, and thin in her thighs.

She's light in her neck, and small in her tail;
She's wide in her breast, and good at the pail;
She's fine in her bone, and silky of skin—
She's a grazier's without, and a butcher's within.

III. Skeleton of the Ox.

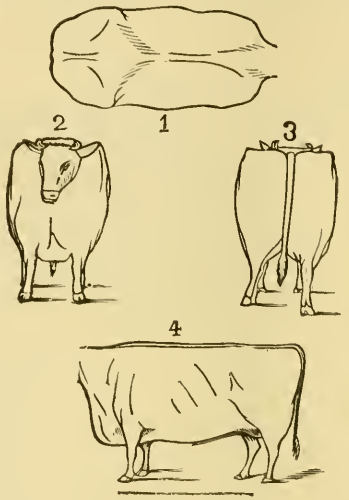
If we look at the skeleton of the ox we shall there see the basis of the immense but sluggish strength for which this animal is noted. It will not be necessary to translate the names of the bones. They should be called by the scientific names here given. The corresponding bones found in the horse have been sufficiently explained.



SKELETON OF THE OX.

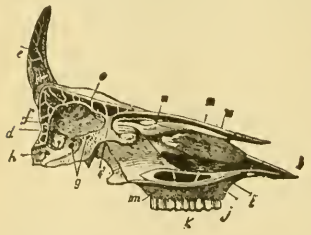
Names of the Bones.—*A*—Cervical Vertebræ. *B B*—Dorsal Vertebræ. *C*—Lumbar Vertebræ. *D*—Sacrum. *E E*—Coccygeal Bones. *F F*—Ribs. *G*—Costal Cartilages. *H*—Scapula. *I*—Humerus. *K K* Radius. *L*—Ulna. *M*—Carpus or Knee. 1—Scaphoid. 2—Semilunar. 3—Cuneiform. 4—Trapezium. 5—Trapezoid. 6—Os Magnum. 7—Uniform. 8—Pisiform. *N N*—Large Metacarpal or Cannon. *O*—Small Metacarpal. *P P*—Sesamoid Bones. *Q Q*—Phalanges. 1—Os Suffraginis or Pastern Bone. 2—Os Coronæ. 3—Os Pedis. *R*—Pelvis. 1—Illium. 2—Pubis. 3—Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hocks. 1—Os Calcis. 2—Ostragalus. 3—Cuneiform Magnum. 4—Cuneiform Medium. 5—Cuneiform Parvum. 6—Cuboid. *X*—Large Metatarsal. 1, 2, 3—Phalanges. *Y*—Small Metatarsal. *Z*—Head. 1—Inferior Maxilla. 2—Superior Maxilla. 3—Anterior Maxilla. 4—Nasal Bone. 5—Molar. 6—Frontal. 7—Parietal. 8—Occipital. 9—Lachrymal. 10—Squamous. 11—Petrous.

Elegance, speed, and muscular activity are the qualities for which the frame-work of the horse seem best suited. In the ox there is also the beauty of symmetry as shown in smooth lines, when fat, and the development of great strength with slow motion. Hence, the limbs are straighter and more massive than in the horse.



OUTLINE OF FAT BULLOCKS.

In the ox we find the same two plates at the top of the head, that were noticed in the horse. In the ox and other horned animals these plates have a considerable space between them, as shown in the accompanying cut giving a vertical section of the head. This space is filled with cells having bony ridges passing from the inner to the outer plate, or table, securing firmness; and these cells form large and strong sockets for the horns. The cavity of the brain is, in the ox, about one-fourth the size of the skull—the other parts being occupied by the organs of smell, the teeth and the jaws, which are exhibited in vertical sections here given.



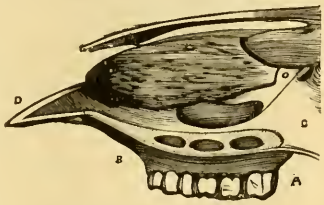
VERTICAL SECTION OF THE HEAD.

IV. Analysing the Head.

The second cut representing a section of the head of an ox, reveals a portion of the upper jaw, showing the molars, or grinding teeth.

Explanation.—*A*—Molars or grinders. *B*—Superior maxillary bone and its palatine process. *C*—Cells of the palatine bone. *D*—Anterior maxillary bone, destitute of incisor teeth.

The frontal bones shown at 6 in the skeleton of the ox, extend from the nose to the superior ridge of the skull, presenting a flat, irregular surface, quite bare of fleshy or muscular covering. The ox has the same division in the center of the frontal sinuses as the horse, but the division between the nostrils is not perfect. There is a continuous cavity from the muzzle to the horn. In polled or horned cattle the frontal bones reach from the nasal bones to the parietal ridge, but since there are no horns, these bones become narrower towards the poll. In cattle the temporal bones are small, but deep in the temporal fossa and have no squamous structure. The occipital bone has little importance by comparison with its use in the horse. The sphenoid and ethmoid bones relatively occupy the same position in the two animals. A comparison of the skeletons of the horse and ox, will fully illustrate this.



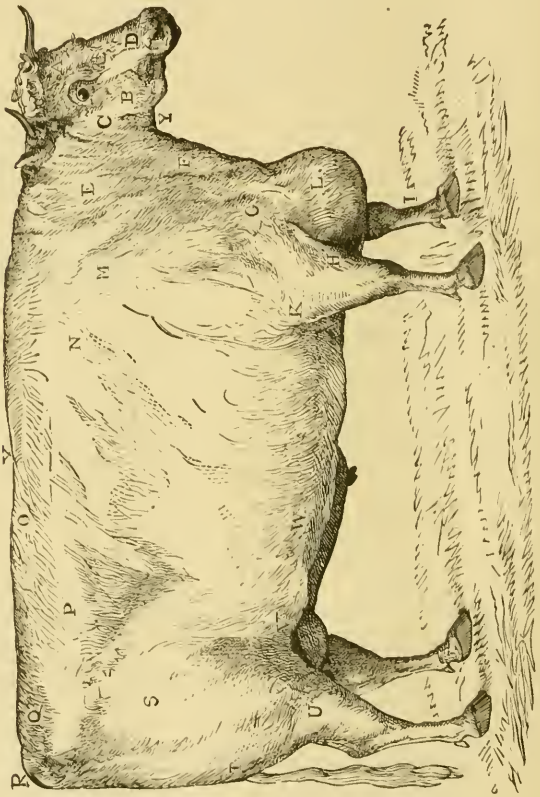
SECTION OF HEAD OF OX.

V. External Parts of a Fat Ox.

As beef is a universal article of food, the value of a very large proportion of the cattle reared is determined by their capacity to develop juicy, palatable meat. The illustration on the next page shows a Short-Horn ox in prime condition, and the accompanying explanation points out the several parts of the animal with reference, mainly, to their qualities and use as beef.

Where the choice Beef lies.—The prime parts of the ox, as shown in the cut, lie from *N* to *R*, and from *R* to *S*, and back to *N*. Between *P*, *Q* and *V* are the best pieces. The second best are between *M*, *S*, *T*, *V*, *W* and *K*. Between *S* and *U* are valuable pieces for smoked or dried meat. The ribs between *M* and *S*; the flanks *V*, *W*, and thence to the brisket *K* are good corning pieces. The quarters of such an ox will dress sixty-five per cent. of his gross weight. The loin above *P* and from thence to the top of the shoulder above *N* will give superior steak and roasting pieces. The shoulder-point or neck vein back of *T* and thigh at *S* make the best smoking-pieces. The plates *W* will make

excellent corned beef, while *R*, *S* and *L* (the rump, round and brisket) make the best pieces for pickling—good, thick, juicy meat, and in large quantities.



SHORT HORN OX IN PRIME CONDITION.

Explanation.—*A*—Forehead. *B*—Face. *C*—Cheek. *D*—Muzzle. *E*—Neck. *F*—Neck-vein. *G*—Shoulder-point. *H*—Arm. *I*—Gambrel or hock. *K*—Elbow. *L*—Brisket, bosom or breast. *M*—Crops. *O*—Loin. *P*—Hip. *Q*—Rump. *R*—Pin-bone. S—Round-bone, thurl or whirl. *T*—Buttock. *U*—Thigh, or gasket. V—Flank. W—Plates. *X*—Back, or chine. Y—Throat.

VI. Teeth of the Ox.

The ox has 32 teeth. These are divided into 24 grinding or molar teeth, six on each side of each upper and lower jaw, and 8 nippers or cutting teeth (incisors) in the front lower jaw. The ox has no canine teeth (tushes,) and no teeth in the front part of the upper jaw. In place of the front upper incisors, those of the lower jaw meet against a callosity above, thick, hard and, in old cattle, almost horny. Scientifically the teeth are represented by the following Dental formula:

Genus Bos. Cattle; incisors, $\frac{0}{8}$, canines, $\frac{0}{0}$, molars, $\frac{6}{6}\ \frac{6}{6}$. = Total, 32 teeth.

But in order that the reader may judge accurately of the age of any animal of the genus *Bos*, but especially the age of cattle, a chart is annexed, showing the nippers, (incisors,) from birth up to the age of five years past—that is, up to the sixth year; and also the teeth as they appear at ten years of age.

An ox at five years old, is past his prime for beef, and at six is past his prime for economical farm labor, except at heavy, slow draft. The cow will breed good calves from three years to the age of ten years, and often up to fifteen years. The bull should be sure in his get, up to about the age of eight years, after which he usually gets fogy.

VII. Age of Cattle told by the Chart.

The age of cattle is only told by the horns and the teeth. The horns will show the age with reasonable accuracy up to the age of six years, by means of the annual rings, and tolerably well up to the age of ten, unless they have been filed, sand-papered and oiled to deceive. As the animal gets older, the annual rings, or wrinkles, of the horns become confused by growing together.

Mr. Youatt, in his analysis of the teeth of the ox, gives six years as the age at which the animal attains the full mouth, such as we have shown at five years past. In his day, cattle were slower in maturing than now, and they were certainly kept in service to a greater age. If the animal is badly kept during the winter, and is turned upon insufficient pasture in summer, development will, of course, be slower. After the teeth are mature, if the pasture is short and gritty, they will be worn away faster.

The rules we give for determining the ages of modern cattle apply to well-kept, early-developing animals. Woods-cattle, those raised in the timber on scant fare, might present the same appearance at six years old that we have shown for five years past. In studying the chart, therefore, allowance must be made for the contingencies we have named. A reference to the chart will show that at birth there are but two central teeth, figure 1; at two weeks the calf will have four teeth, figure 2; at three weeks it will have six teeth, figure 3; at a month old the jaw will con-

tain eight incisors, and present the appearance as in figure 4. The mouth is then called full, as containing the ultimate number of incisors. These are not permanent, but temporary, or milk teeth, as they are called. At six to eight months old the central teeth begin to be worn, and show smaller than the others, see figure 5. At ten months absorption and the widening of the jaw will have carried the two central teeth still farther away from each other, and two other teeth, one on each side, will have begun to diminish, in fact will have distinct spaces between them, see figure 6. At twelve months absorption will have continued to two more teeth, leaving intact only the two outside teeth, see figure 7. At fifteen months the whole of the teeth will present the appearance as seen in figure 8. At this time the true or permanent teeth will have been growing in the jaw, between and back of the milk teeth. Figure 9 shows the appearance at fifteen months of age, the two permanent central teeth appearing in the place of the two first milk teeth which have disappeared, and the other permanent teeth are shown in their several stages of growth. Figures 10, 11 and 12 show the teeth at two, three and four years past. At the age of five years the animal will have a full mouth, as shown in figure 13, and at ten years the incisors will present the appearance as in figure 14.

Thus any person by the use of the chart, and by examination of the teeth of cows, of ages known to correspond therewith, may easily become an accurate judge of the age of cattle up to the age of four years. In the four-year-old mouth, the two central pairs of teeth are beginning to be worn down to the edges, and in a flat direction, or inclining slightly to the inside; yet the animal has not a full mouth—that is, the incisors are not fully up until it is five years old. See figure 11.

At five years old the teeth are fully grown, and the peculiar mark on the teeth, called the cup, is shown in all. At the same time all will have become flattened, while on the two center ones there begins to be a distinct darker line in the middle, bounded by a line of harder bone. From this time on we may depend both on the incisors and the grinders. At six years old the animal will have acquired the last grinding tooth. This is the sixth molar and is, from the beginning, a permanent tooth. From this time until the eighth year, and indeed thereafter, in determining the age of the animal, the nature of the soil upon which it has been fed must be taken into account. Gritty, close-fed pastures will wear them faster, and flush pastures slower. Thus in all the pasture regions of the West, and Southwest, the wear will be light. As a general rule, but admitting of many exceptions, at seven years old this line is becoming broader and more irregular in all of the teeth; and a second and broader, and more circular mark appears within the center of the former one, the most

Chart for Accurately Telling the Ages
OF
CATTLE.

N. D. THOMPSON & CO., Publishers,
ST. LOUIS, MO.

For further facts concerning the Ages of Cattle see Part III. Chapter II.

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Fig. 1.

Teeth of Calf at birth, showing the first two incisors, milk teeth.

Fig. 2.

Teeth at two weeks old, showing four temporary incisors.

Fig. 3.

Teeth at three weeks old, showing six incisors.

Fig. 4.

Teeth at one month old, showing eight incisors, or the full set.

Fig. 5.

Teeth at six to eight months old, showing wear on first two, or central teeth.

Fig. 6.

Teeth at ten months old, showing absorption in first two pairs of teeth, and wear of two outside pairs.

Fig. 7.

Teeth at twelve months old, showing absorption in all the nippers, except outside pair and wear in these.

Fig. 8.

Teeth at fifteen months old, showing absorption and wear in all the temporary nippers.

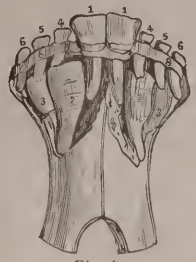


Fig. 9.

Teeth at eighteen months old, showing two first permanent incisors (1-1), and next two pairs (2-2 and 3-3), growing and pushing upwards toward the surface; also (4-4, 5-5 and 6-6) showing absorption. At e e is shown the alveoli, or cells for the teeth

Fig. 10.

Teeth at two years old past, showing four permanent incisors, and four temporary ones, absorption nearly complete, also marks of wear on two first pairs

Fig. 11.

Teeth at three years past, showing six permanent nippers, and two outside temporary ones nearly gone, also wear on two central pairs.

Fig. 12.

Teeth at four years past, showing eight permanent incisors — the full mouth — and complete complement; also wear on all but outside teeth

Fig. 13.

Teeth at five years past, showing wear and dark marks.

Fig. 14.

Teeth at ten years old, showing permanent spaces between them, and also shape from natural wear by use.

distinct in the central, or two central pairs—and which, at eight years, has spread over the six central incisors.

At eight years, a change takes place which cannot be mistaken. The process of absorption has again commenced in the central incisors; it is slow, and is never carried to the extent seen in the milk teeth, but is sufficiently plain, and the two central teeth are evidently smaller than their neighbors. A considerable change has also taken place on the surface of the teeth; the two dark marks are worn into one in all but the corner teeth.

At ten years old the four central incisors are diminished in size, and the mark is becoming smaller and fainter, as shown in figure 14. At eleven years the six central incisors are smaller, and, at twelve, all of them are very considerably diminished; but not to the same extent as in the young animal. The mark is now nearly obliterated, except in the corner teeth, and the inside edge is worn down to the gum.

From the age of twelve years and onward, the teeth diminish more and more, so that the animal cannot properly gather or grind the food. There are many instances, however, of cows breeding, and remaining good milkers, up to twenty years of age and over. But in this day of early development, no careful farmer will keep a cow breeding after the age of twelve years, except, perhaps, in the case of some extraordinary milker, or an exceptional cow, of great physical powers, and excellent breeding qualities, whose stock it may be desirable to perpetuate.

CHAPTER III.

DEVELOPMENT AND IMPROVEMENT OF BREEDS.

I. ANCIENT AND MODERN BREEDING.——II. CATTLE OF THE CAMPAGNAS.——III. PIONEERS OF IMPROVED STOCK.——IV. ILLUSTRATIONS OF NOTED ENGLISH BREEDS.——V. DO NOT ATTEMPT TO FORM A BREED.——VI. HOW A BREED IS FORMED.——VII. BREEDING FOR CERTAIN USES.——VIII. VARIATION IN TYPE.——IX. IN-AND-IN BREEDING AND BREEDING IN LINE.——X. ALTERING THE CHARACTER BY CROSSING.——XI. INFLUENCE OF SHELTER AND FEEDING.——XII. HEREDITY IN CATTLE.——XIII. HEREDITARY INFLUENCE OF PARENTS.——XIV. ATAVISM.——XV. PECULIARITIES OF ANCESTORS PERPETUATED.——XVI. HOW THE SHORT-HORNS WERE BRED UP.——XVII. SHORT-HORNS DURING THE LAST FIFTY YEARS.——XVIII. THREE SHORT-HORN STRAINS.——XIX. THE THREE PRINCIPAL TYPES OF CATTLE.

Ancient and Modern Breeding.

It might be curious to trace the history of cattle, step by step, in their improvement from the earliest times; but the results of such a task would be largely composed of conjecture, neither valuable as history, nor interesting, except to a few. The aim of this work is to be practical, and its object is to give only such valuable information as will be useful or interesting to all readers engaged in the breeding, rearing or use of live-stock.

While many distinct breeds of cattle have been known from the beginning of the historical era, it is only within the last 200 years that careful and systematic breeding has been resorted to. And it is probable, or, rather, it is positively true, that during the last fifty years greater results in the breeding of all farm animals have been accomplished, and greater progress towards perfection have been made, than in all the time before.

Jacob was the first systematic breeder of whom we have any record. It is tolerably certain that he understood something of the principles of mating cattle, else he could not have produced pied and other parti-colored animals in such numbers as to have assured him large profits and increase in the herds of his father-in-law. But Jacob's plan consisted simply in bringing together cows and bulls of certain different colors, with a view to securing a commingling of these colors, in the offspring. It does not appear that he made any systematic attempt to improve, by breeding, the qualities of his animals as milkers, draft oxen, or beef cattle. The results of such efforts, if they had ever been made, would as certainly have been noticed as the extensive production of "ring-streaked and speckled cattle."

II. Cattle of the Campagnas.

We have already spoken of the once-famous cattle of the Campagnas, in the time of the Romans. Their excellence was probably due more to

the kindliness of the climate and the natural abundance of the pastures around Rome, than to any systematic endeavors to perpetuate good qualities, except by the simple rules of natural selection. The same is true of other ancient peoples whose cattle were once held in high repute. Abundant pasturage, extensive ranges and a genial climate were the important factors in the production of their superior stock, which, in all probability, was not much superior to the half-wild cattle herded upon our great western plains.

During the dark ages which succeeded the fall of the Roman Empire, agriculture degenerated with the arts, and, until about the sixteenth century, little attention was paid to the breeding of cattle, except by a primitive sort of selection, and by keeping certain strains of cattle confined to given sections of country.

III. Pioneers of Improved Stock.

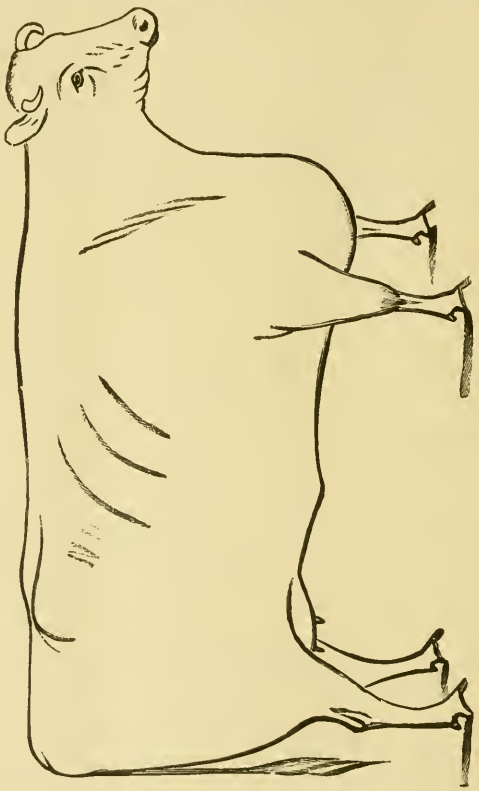
But little had been done in a systematic way to improve British cattle until Bakewell improved the Long-Horns. Subsequently the Collings bred up the Durhams or Teeswaters, and later breeders developed the Devons, to which the Sussex and Hereford breeds owe some of their most eminent qualities. The celebrity of the improved Leicesters ceased soon after the death of Bakewell. But the Short-Horns had then already become famous, and at the present day there is no other breed of beef cattle that combines so many good qualities, except the Herefords. And this noble breed, it must be confessed, is the peer of the Short-Horns in every respect, except perhaps early maturity, while in butchers' proof, it is probably superior to the Short-Horns. On the butchers' block, however, both the Short-Horns and the Herefords must yield precedence to the Devons, and the Devons again to the West Highland cattle of Scotland.

IV. Illustrations of Noted English Breeds.

That the reader may become familiarized with noted English breeds of cattle, for beef, for labor, and for milking, we give on page a model of the Sussex cow; on page a Short-Horn cow in outline; and on page an improved Hereford Bull, allied to the Sussex. On page a North Devon cow is represented; and on page a Jersey or Alderney bull. On page will be found a group of Durhams as they were known fifty years ago. With the descriptions of the various popular breeds, as they will be noticed hereafter, illustrations will be given showing their characteristics. The comparisons will be found a valuable study to all who make the breeding of cattle a part of their farm economy.

Do not Attempt to Form a Breed.

In the breeding of cattle do not attempt to form a new breed out of incongruous materials, such as you may happen to find near you. Good feeding, good shelter, and careful selection, will do much for any breed,



SHORT-HORN COW IN OUTLINE.

but to undertake to form a new breed can only end in failure. It will be found infinitely cheaper to take one of the breeds already formed, according to the use for which the animals are intended, than, by crossing and breeding up, to form one that at the end of one hundred years will be no better than some of the now-existing herds, and, perhaps, not as good. If there is any improvement to be made, make it on the model of the best of the more reputable breeds. For instance, the Short-Horns can

easily be bred back to the milking quality by selecting the proper families; for they once possessed this quality in an eminent degree. If you wish to improve your common stock, do it by crossing upon the best of your common cows good, staunch, vigorous bulls, of the breed conforming to the type of cattle you wish to attain. The first cross will give you half-bloods; the second three-quarters blood; the third cross seven-eighths blood, and the fourth cross—fifteen-sixteenths blood. These latter, and, even the seven-eighths bred cattle, are, for all practical purposes, of beef, labor or milk, essentially as good as those purely bred. But it is necessary that pure and thoroughbred stock be kept intact, by every possible precaution, since they are the source from which all excellence is bred. Therefore, if you are able to breed the best, let all others alone. And there are so many cattle of pure and thoroughbred stock now, that such sires are not difficult to obtain, unless you wish to breed the very highest caste, and this, too, from a purely fanciful standpoint.

VI. How a Breed is Formed.

A breed is a variety. In plants a new variety of a species is produced by crossing one variety on another. In the case of crossing two species of the genus, to produce a hybrid, the fertility is generally destroyed, and the hybrid cannot be perpetuated. In crossing two animals or plants of the same species, but differing one from the other, the product is fertile, though not in so great a degree as in animals or plants of a like kind. The descendants will partake more strongly of one parent than the other, and these variations, in some cases, crop out after generations.

This atavism or striking back to some remote ancestor is not infrequent in the Short-Horns, notwithstanding the extreme care taken in breeding, and the many years that have passed since the particular cross was made. On the other hand, the Devons breed constant to type, or nearly so. Hence, the Devons are called a pure breed, and the Short-Horns are called thoroughbred. The Herefords also retain this constancy in general character to a remarkable degree, for the reason that they are an original breed, and not, like the Short-Horns, and racing horses, made up of a mixed lineage, and developed within a comparatively short time. Thus the reader will see the force of the advice, "Do not attempt to form a new breed."

VII. Breeding for certain uses.

For present practical purpose let your sires be the best you can afford, of some improved breed, which should be chosen with reference to the purpose for which the offspring is intended. For beef and early maturity choose a Short-Horn or Hereford bull. If you breed for beef and labor,

take the Hereford for heavy work, and the Devon for lighter and more active work, such as ordinary farm labor. For cheese or quantity of milk alone, take the Holsteins. For butter and cheese the Ayrshires are best, while for milk, exceedingly rich in cream, but, of course, not so great in quantity, the Jerseys, Alderneys or Guernseys would be indicated, according to the fancy of the breeder. In every case select the best cows possible as dams, at least for the animals intended to continue the cross.

VIII. Variation in Type.

We have spoken of variation in type, even of cattle bred with a view of perpetuating distinct characteristics. How common this is, any person may satisfy himself by inspecting the animals of any given kind at our animal fairs, especially horses and cattle. Among animals producing twins, such as sheep, the type may be established sooner, since there is a greater number of young to select from. In swine it may be established in a still shorter time, for they not only have many young at a birth, but they breed twice a year, and a sow has even been known to produce five litters in less than two years. In the longest-established breeds of swine, however, pigs of a litter will vary materially. Hence, in breeding swine, while it is comparatively easy to perpetuate a particular strain by careful selection, it is also as easy to destroy the effects of previous good breeding by bad selections as it is to depreciate them by neglect in feeding. For it is an axiom which should be more generally understood than it is, that bad feeding will soon mar good breeding. And as no success can be had with any breed, however ordinary it may be, without good feeding, it is essential that the improved breeds be carefully and liberally provided for, especially since the better the breed the better do the animals pay for their feeding.

IX. In-and-in Breeding and Breeding in Line.

The meaning of these terms has been defined in a previous part of this volume. One is the breeding together of animals very closely related; the other is the perpetuation of qualities, by continuing to breed together animals having similar characteristics. From in-an-in and line breeding we get, more often, what is called a "nick"—that is, the inheritance of some essentially good quality—than by what is known as out-crossing, or breeding to animals of dissimilar quality. The careful breeder will hesitate long before he resorts to out-crossing, and should only consent so to do where the family has become too fine, and constitutionally weak, from being bred very closely together for a considerable length of time.

X. Altering the Character by Crossing.

When it becomes necessary to alter the form, do so through some animal of the same breed. Never go out of the breed for improvement even in constitutional vigor. If you do, you will always rue it. The Kyloe cross, made in the Short-Horns, nearly a hundred years ago, still crops out in certain families, in the sloughing of the horns, or in defective horns. Thirty years ago the outcrop of this peculiarity was quite common. If the character of your cattle needs altering, select for the purpose a bull possessing the characteristics desired, or as near thereto as may be possible. Once the effect is produced, return again to the practice of breeding in line, never neglecting careful selection. So also in breeding up common stock, by means of superior males, when once you have decided what breed is best for your particular use, stick to it. If the result is unsatisfactory, try another breed on certain cows, but not on those of your best improved stock. If you are breeding pure or thoroughbred stock, quit the business rather than take an out-cross upon some other distinct breed. Once the blood is in your herd, you cannot breed it out in your life time, nor can your successor breed it out in his life time.

XI. Influence of Shelter and Feeding.

In the breeding of all farm stock too many persons suppose that animals, especially cattle, may be exposed to the storms of winter without serious detriment, and that if they get very thin in winter, they will recuperate in the succeeding summer. No mistake could be more fatal to the stock raiser than this. An animal that barely survives the winter, seldom more than regains the flesh lost, during the next summer. Those that have to be "tailed up" in the spring never are good for much thereafter. The only profit there is in stock of any kind, is made by keeping them steadily growing, until they reach maturity. This is especially true in the case of improved stock of whatever breed. They must have sufficient warmth and feeding, for if disability arise from neglect, the loss is serious by comparison with the loss from similar injury to ordinary, cheap stock. It may be taken as an axiom, that no money was ever made by neglecting or starving farm stock; and no farmer ever will make money from cattle if he lets them take the "warm side of a straw stack" for food and shelter in winter.

XII. Heredity in Cattle.

We have already spoken of the hereditary influence of ancestors. In cattle this is often plainly shown. The thirteenth axiom of Stonehege, and one undoubtedly correct, is: The purer and less mixed the breed, the more likely it is to be transmitted unaltered to the offspring. Hence, which-

ever parent is of the purest blood will be more generally represented in the offspring; but, as the male is usually more carefully selected, and of purer blood than the female, it generally follows that he exerts more influence than she does; the reverse being the case when she is of more unmixed blood than the sire.

That the relative ages and vigor of the parents have a decisive influence on the offspring there is no doubt. Hence the necessity that animals be mature before they are allowed to breed, since only mature animals can be relied upon to produce offspring of the highest form and vigor. And on the other hand, that excessive age in either male or female, will diminish potency is too well known to be denied. It is certain, also, that where there is a marked prepotency in either the male or female parent, the progeny will most closely resemble the prepotent progenitor. The following case is reported by Mr. Talcot in the "Country Gentleman:" "I had a nice cow with nice bag and teats, which I took to a bull in the neighborhood, and the produce was a heifer-calf, which was raised because of the good milking-qualities of her dam; but when she became a cow, instead of the good qualities of her dam as was expected, her bag and teats were more like those of a sheep than of a good dairy-cow. I then began to investigate the cause, and found that the heifer was the counterpart of the dam of the bull, she being an ordinary cow with a small bag and still smaller teats, and from that time to this I have found that too frequently that is the case, especially if the bull was from such stock or family of light milkers that it was not desirable to perpetuate them. I remember distinctly the first pure-bred Short-Horn bull I ever had, that the bag of his dam was the largest in the hind-quarters, consequently that she gave the most milk from the hind-teats, and that quality was transmitted to the majority of his heifers when they came to be cows, their bags tending largely in the hind-quarters. And I think, from such observations, that there can be no doubt that such is the case generally."

Mr. Sedgwick says, the supply of milk is hereditarily influenced by the bull, rather than by the cows from which the offspring is directly descended. Of this there is no doubt; but it is not so clear, as asserted by him, that the character of the secretion, as regards both quantity and quality of the milk, is derived chiefly from the paternal grand-mother by atavic descent.

XIII. Hereditary Influence of Parents.

Mr. Walker, writing on intermarriage, and the physiology of breeding, gives the following:

"It is a fact, established by my observations, that, in animals of the same variety, either male or female parent may give either series of or-

gans—that is, either forehead and organs of sense, together with the vital and nutritive organs, or back-head, together with the locomotive organs.

"The second law, namely, that of crossing, operates where each parent is of a different breed, and when, supposing both to be of equal age and vigor, the male gives the back-head and locomotive organs, and the female the face and nutritive organs.

"The third law, namely, that of in-and-in breeding, operates where both parents are not only of the same variety, but of the same family in its narrowest sense, and when the female gives the back-head and locomotive organs, and the male the face and nutritive organs—precisely the reverse of what takes place in crossing."

XIV. Atavism.

The appearance, occasionally, of horns in the Galloway, Suffolk and other breeds that have been hornless for many generations, but which were originally a horned race, are remarkable instances of atavism. The appearance, in a litter of Essex pigs, of two young ones showing the Berkshire cross of twenty-eight years before, as cited by Mr. Sidney, is also a remarkable case of the same kind. We have already noticed the occasional appearance, through atavism, of deformed horns in Short-Horn cattle. In calves, also, this race shows remarkably in this respect; the following case is given by the "Country Gentleman:"

"Mr. Wadsworth owns the twin Princess cows, Lady Mary seventh and eighth; they are both good roans, got by fourth Lord of Oxford (5903 "American Herd-Book"), a roan bull; their dam, Lady Mary, a red, got by Hotspur (31393), a roan; their granddam, Baroness, a red roan, got by Barrington (30501), a white; their great-granddam, the imported red Princess cow, Red Rose, second, got by Napier (6238), red roan. These twin heifers, Lady Mary seventh and eighth, were both served by the Princess bull, Earl of Seaham (8077 "American Herd-Book"), a good roan, and each dropped a bull-calf; but the one from Lady Mary seventh was a red, while the other, from Lady Mary eighth, was white."

XV. Peculiarities of Ancestors Perpetuated.

In the breeding of animals of a pure and homogeneous breed, there will be a perfect blending of characteristics, without marked peculiarities, as a rule. In the offspring of dissimilar parents, as in crossing, there is never complete fusion or blending of character, but the offspring in such cases will follow, more or less closely, the prepotent parent. It is not necessary to cite authorities on this point. Instances are of such constant occurrence, both in the human family and down through all the domestic animals, that they have been noticed by all intelligent observers. In wild

animals, being pure races, the rule is not so apparent: for in them is found the nicest blending of transmitted qualities. Yet it is observed even in wild animals when bred in confinement. Devon cattle and other pure breeds of domestic stock, also show peculiarities to a less extent than more mixed races. Peculiarities of ancestors appear most frequently in the common mixed stock of the farm, especially when bred to sires of improved blood.

XVI. How the Short-Horns were bred up.

The inheritance of the prepotent blood of sires, upon an already valuable breed, careful selection and at length the impress of a bull, (Hubback,) remarkable in every respect, merged what were known as Teeswater, Durham or Yorkshire cattle, into what has come of late years to be known, the world over, as Short-Horns. The name is an unfortunate one in some respects, since it is used to designate one of the three distinct classifications of horned cattle.

Less than 200 years ago the first improvement was made in Short-Horn cattle, according to Culley, Marshall, Bailey, and others of the last century; and it is only within the last 100 years that the great improvement was made which causes this magnificent breed of cattle to be so highly prized. The "Alloy," a Galloway, or hornless, cross made by Charles Colling was unfortunate, and breeders are careful that their stock shall not trace back to this cross, which runs to Grandson of Bolingbroke and Lady—to the "Alloy" as this progeny was called.

XVII. Short-Horns During the Past Fifty Years.

It is within the last fifty years that the Short-Horns, once remarkable for their milking qualities, have degenerated in this respect so that they are now almost worthless for the dairy. They have been bred to eminent fineness and elegance, but it is questionable if, as beef producers, the less fashionable are not the better cattle. Originally the Short-Horns ran much to white; and roans also were very common. Of late years it has been more fashionable to breed to self-colors, or to animals in which the colors, whatever they may be, (red and white being the best,) are distinct and well defined, one from the other.

Importations of Short-Horns from Great Britain were made to the Eastern States in 1815, 1822, 1823, 1828, 1835, 1839, and 1849–50; to Kentucky in 1817, and again in 1837-38, and in 1839. Large importations were made into Ohio in 1834, and in 1835–36. The first direct importation to Illinois was made in 1858. Since 1835 Canadian breeders have imported many fine animals, and within the last ten years their herds have taken high rank in the world of Short-Horns. At the present time there are no States of the West, the Northwest and Southwest, but

have most valuable herds of these remarkable beef cattle. When not bred from a mere fanciful standpoint of fineness, it must be confessed that they are unexcelled in stoutness, early maturity and great development of flesh.

XVIII. Three Short-Horn Strains.

Among the lessons learned from these changes, we have seen the Short-Horns gradually lose their great milking qualities, but they have gained in early maturity, and in disposition to take on flesh. They may now be divided into three classes:

First, are those combining good grazing qualities with fair milking qualities, as may be seen in the descendants of the importation of 1817 into Kentucky, or the "Seventeens" as they are called. None are better than these for the average farmer to breed from, and fortunately, when found, they sell at prices comparatively but little above those of the best native cattle of mixed breeds.

The second strain is the Booth blood, eminent for large frames, covered with great masses of flesh, but of small account as milkers.

The third principal strain is that of the Bates cattle, eminent for style and early maturity, with sub-families, producing occasionally most excellent milking cows.

The young breeder may rest assured that by studying carefully the precepts laid down in this chapter, and by familiarizing himself with the characteristics of the several strains, and also by studying carefully the pedigrees as given in the herd books, he will be qualified to select animals for the nucleus of his herd, that will breed constant to type, if he possess the judgment properly to mate them.

XIX. The Three Principal Types of Cattle.

It remains to close this chapter with a recapitulation of the three principal types of cattle. These are the Long-Horns, the Middle-Horns and the Short-Horns. Of the Long-Horns, sub-breeds remain worthy of perpetuation in competition with the Middle-Horns, as represented by the Herefords or Devons, or the Short-Horns, as represented by the Durhams. The milking breeds are the Jerseys and other Channel Island cattle, and the Ayrshires and the Holsteins.

Among the traces of long-horned blood, characteristic of the old Shropshire, with their horns dropping down forward and suddenly rising, the Derby with their horns running sideways, and curving upwards and backwards, and the Cravens, with their "lopped horns," may all be found occasionally in the ordinary mixed breeds of the country, showing how long a time it takes to work out the blood from whence they originally came.

As for the once-famous New Leicesters, of Bakewell, their popularity was short-lived, since they practically died out with the death of their founder, Bakewell.

The Short-Horns will be treated of in their appropriate chapter, the Herefords and Devons in the chapter appropriated to the Middle-Horns, and the polled cattle, also, in a separate chapter.

CHAPTER IV.

THE BREEDING OF CATTLE.

I. EARLY SYSTEMS OF BREEDING.——II. BAKEWELL'S TEN RULES.——III. WHAT THE BREEDER MUST KNOW.——IV. COMPARE RESULTS.——V. THE ASSIMILATION OF FOOD.——VI. THE BREEDER MUST BE A GOOD FARMER.——VII. BREEDING FOR BEEF.——VIII. BREEDING FOR MILK.——IX. BREEDING FOR LABOR.——X. THE BREEDS FOR BEEF AND MILK.——XI. SOME FACTS ABOUT BEEF.——XII. VALUE OF SIRES IN DIFFERENT HERDS.——XIII. KNOW WHAT YOU BREED FOR.——XIV. DEFINITION OF TERMS.——XV. HOW TO START A HERD.——XVI. HOW THE HERD WILL GRADE.——XVII. TAKING A LINE CROSS.——XVIII. SOME SPECIMENS OF CLOSE BREEDING.——XIX. THE GESTATION OF COWS.

I. Early Systems of Breeding.

Until within the last 200 years the whole art of breeding animals might have been summed up in the aphorism, "Like produces like;" and hence that other proverb, "Breed from the best." Yet, simple as these principles were, they seem to have been followed in a very feeble way, as, indeed, they are to this day by a majority of farmers, or by those who have not studied the principles of the art they practice.

Up to the time of Bakewell, who, had he undertaken any other profession than that of breeding animals, would have been eminently successful, the breeder's art consisted in mating those animals whose general characteristics seemed the best, wholly disregarding the advantages of breeding to animals pre-eminent for the possession of particular qualities that it was essential to perpetuate. Bakewell believed not only that like would produce like, in a general way, but seems to have known that the rule extended to the minutest detail in the organization and make up of the animal. Hence, his study of form, in the anatomy and physiology of animals, was made with a view to the adoption of a standard, or model, by which he sought to secure large proportions, early maturity, superior flesh in the choicest parts, and uniformity in the transmission of these qualities from the sire and dam to the young.

His eye seems to have been so well trained in detecting faults in the development of animals, and the proper correlation of the parts, one to the other, that the slightest variation of form never escaped him. No breeder since his time seems to have used such nice judgment, or to have possessed so critical and thoroughly trained an eye. None of his successors have equaled him in the capacity to trace cause and effect, or to

breed closely to a well-defined standard. In addition to his nice judgment in selection, he was the most careful of feeders; the object in view being constant development from birth to the butcher's block. None before or since his time have ever brought a breed up to the highest possible standard in a single lifetime, and what is more curious, none were found able to maintain the standard he had fixed. The methods instituted by Bakewell have been practiced by others, and are undoubtedly the best in the breeding of live stock. They may be divided into separate heads as in the following section.

II. Bakewell's Ten Rules.

1.—Correct training of the eye and judgment in the anatomy and physiology of the animal.

2.—The correlation of the several parts one to the other.

3.—The selection and mating of animals with a view to the fullest development of the most valuable parts, according to the use intended.

4.—Selection with a view to the perpetuation of essential qualities to induce form, symmetry, high feeding qualities, and great vigor of constitution.

5.—Feeding with reference to early maturity for giving development in the least possible time.

6.—Shelter and warmth indispensable to perfect development.

7.—Variety of food is essential, and this according to the age of the animal.

8.—A strain of blood once established, never go outside of it for a new infusion.

9.—The most perfect care and regularity in all matters pertaining to feeding and stable management.

10—Kindness and careful training absolutely necessary with a view to the inheritance of high courage combined with docility and tractability.

III. What the Breeder Must Know.

The animals which possess the qualities that are desired in the offspring, whether for beef, labor, milk, butter or cheese, or for a combination of these, are the ones to breed from. In the selection of parents the breeder himself must of course be the judge of the fitness of certain animals of his herd to transmit the desired qualities. We have endeavored to aid the non-professional breeder in the performance of this delicate task, by carefully describing the peculiarities of the different breeds and varieties, and by indicating the best points of each of them. Nothing more is necessary to enable the average farmer to breed his farm-stock profitably and successfully, except such personal experience with animals as every competent

farmer possesses as a matter of course. Those who propose to go exclusively and scientifically into the business of stock-breeding, must not only pass through a careful course of reading in the best authorities on the subject, but must also have a thorough practical training. The important thing of all, however, is to possess the peculiar talent to make a breeder—that is, a critical eye for form, symmetry, and the proportion of the several parts of an animal, each to the others.

IV. Comparo Results.

A careful comparison of the results obtained by others and by one's self, is among the best means of training for all. The animal that will make the most beef at three years old, and the cow that will give the most milk, and the richest in butter or cheese during the season, on the least relative quantity of food, are the best. These things can only be learned through personal observation and from the statements of those whose word you can trust.

V. The Assimilation of Food.

It is an idea with many people that an animal, to be valuable, must be a small eater. Nothing could be further from the truth. It is merely a question of proper assimilation of the food eaten—an animal of perfect digestive and assimilative organs being able to extract far more nutriment from a given quantity of food than one in which these organs perform their functions but imperfectly. In this respect the improved breeds of stock of any family stand pre-eminent. Their digestive and assimilative organs are of the best and they give greater returns for the food eaten than illy-bred animals.

The lungs and blood vessels of the ox are not required to be so capacious, according to the weight of the animal, as those of the blood-horse; for they are not required to do fast work. The improved breeds of other farm stock are not required to take more exercise than is necessary to gather their food. Hence, with care and artificial feeding, the inclination to active exercise is bred out of them, and a Short-Horn or Hereford will keep fat on what a Texan would run off in untamable muscular efforts. Thus, for domestic use, the highly-bred Short-Horn or Hereford possesses two important advantages over the wild Texan, viz: early maturity, and the tendency to fatten readily.

A raw-boned ox, or one with a hide like a board, will not fatten kindly. Hence, the outlines should be square or round, with no undue bony prominences, and the skin should be soft, but firm and supple to the touch.

Restlessness, which is only another term for wildness, should never be tolerated in any breeding animal. Such animals should be sent to

the butcher's block without hesitation. A panic will throw a whole herd off their feed for a week, sometimes, and a single wild brute is amply sufficient to get up a stampede at the slightest provocation. The animal that shows viciousness alone, or in connection with restlessness, is not to be tolerated anywhere, and least of all in the breeding stables or yards.

VI. The Breeder Must be a Good Farmer.

The best animals cannot be raised except on a variety of food. The breeder should therefore be a good farmer, and should know what grasses are most nutritious and best adapted to his locality. He needs, also, to know the varieties of grasses which make the best hay, for all farm animals—cattle and sheep especially—should be kept as much on grass as possible. He should also have studied the important question of winter feeding with a view to deciding what grains are best adapted to his use.

An important matter, which nearly all American breeders and feeders more or less neglect, is the use of succulent food in winter. It is seldom one sees a supply of roots raised for winter feeding in this country. We have deferred too much to English authorities, and because we could not raise English white turnips we have ignored roots almost entirely. Yet, there is no country better adapted to carrots and beets, for feeding, than ours, nor one where they can be more cheaply raised. And carrots in winter, especially for breeding cows, and later on beets for all farm stock except horses, are worth more than twice their bulk in turnips. A peck of beets or carrots daily, to each cow or ox would assist in an important manner the digestion and assimilation of dry food—and herein lies their chief value. The writer has raised them in large fields at a cost of three dollars a ton, including the expenses of hauling and pitting for winter.

VII. Breeding for Beef.

If you breed for beef you will have the choice of, say, four breeds of cattle—the Short-Horns, the Herefords, the Devons, and the Galloways. The Short-Horns and Herefords are, by all odds, the best breeds wherever the pastures are flush, and the feed plentiful. On short pastures, and when the winter feeding is not ample, their great frames cannot be supplied; but when the feed is abundant they may be turned off fat at an age at which native cattle are only just getting ready to be fattened.

Upon all hill pastures, both North and South, the Devons are admirable cattle, and their beef is of a quality superior to that of either of the breeds just named.

Farther North, the Galloways or horuless cattle are much liked for their good feeding qualities, for their hardiness and for the superior

quality of their beef. In more Northern regions the Galloways may justly be regarded as the best among our beef breeds. But they will never compare with the Short-Horns or Herefords in milder regions where feed is abundant.

VIII. Breeding for Milk.

If milk be the sole object, the breeder will choose the Ayrshires, the Jerseys or the Holsteins. Of these the Holsteins give the largest quantity of milk, are the largest cattle and they make heavy beef when dry. They are the best for cheese, and are, also, the most profitable when the milk is to be sold directly to the consumer. The Ayrshires come next in the quantity of milk given, and they are, also, excellent both for butter and cheese. The Jerseys, Alderneys, and Guernseys are smaller cattle than either the Holsteins or Ayrshires, but, for their size, they give large quantities of milk that is extremely rich in cream and butter. But they require more feed in proportion to their size than either the Ayrshires or Holsteins.

IX. Breeding for Labor.

Where animals capable of performing labor are desired, either the Herefords or the Devons should be selected. For heavy draft, such as hauling great logs in the timber, the Herefords are excellent cattle. For general utility on the farm, and on the road, the Devons are superior to any other known breed, since they combine great activity with muscular strength, and the ability to go long distances at a quick pace, without distress. The Holsteins also make excellent draft animals, and to our thinking are among the best, where many purposes, milk being the most important, are to be considered.

X. The Breeds for Beef and Milk.

For the two purposes of milk and beef combined, the milking strains of the Short-Horn family are the best. It is a pity that the noble breed of milking cattle, known formerly as the Patton stock, should have been practically lost. Forty years ago they were the staunch, excellent Short-Horns of the West, good at the pail, large, smooth-framed and kindly fatteners. The farmer who wishes to breed similar cattle, may easily do so by selecting the better milkers of the importation of 1817—the "old Seventeens" as they are called. But be sure you do not get animals of this race with "top crosses" of the now fashionable Short-Horns. They will make beef but not milk.

The Holsteins should not be passed over in naming cattle for general utility, especially in the West and Southwest. They are abundant and uniform milkers, and good feeders. They make more than fair working

steers, and when fat they also turn out a heavy carcass of beef, of fully as good quality as the Short-Horns. Yet, they lack early maturity.

XI. Some Facts About Beef.

The breeder for utility, from a purely practical stand point, wants animals that will bring the largest return in dollars and cents. A steer that loads with mere fat, instead of muscle, will not bring so much as the one which turns out more meat and less fat. So, again, the steer whose flesh is marbled throughout with fatty tissue will bring a higher price for beef than one all lean in the lean parts, and all fat in the fat parts. Hence, in estimating the possible profits in breeding for beef, one must know how the animal will cut up when killed. As a rule the smooth steer will "kill better" than a patchy one, or one with lumps or patches of fat over the surface. An animal will not marble with fat until it is mature, neither will it take on fat largely, while in a growing state. Hence, the value of early maturity, and the importance of knowing those breeds, or families of a breed, which mature earliest. The Short-Horns have somewhat the advantage of the Herefords in early maturity, while the Herefords have the advantage of the Short-Horns in the quality of their flesh. The Devons mature still later than either, but their "butchers' proof" is better. The Galloways mature between the Hereford and Devon in point of time, and their flesh is certainly excellent. Those animals which mature earliest are, as a rule, not so excellent in the quality of the flesh as later-maturing ones. Hence, in England, the Highland cattle bring the highest price per pound of any, and in the United States the Devons ought to.

XII. Value of Sires in Different Herds.

The average farmer cannot pay the extravagant prices demanded for the highest-caste animals of a pure breed. These, however necessary to the special breeder, are not so to the general breeder, or to the farmer who breeds simply for beef or for milk. The farmer wants animals having thick flesh and good feeding qualities, with constitutional vigor, from which to breed beef cattle; and when milk is an object the animals from which he breeds should also be known to possess high milking qualities. In the one case it is the flesh that pays, in the other the udder.

To the breeder of a particular strain, an animal containing certain valuable points might be worth many thousands of dollars in his herd, while to the farmer the value of the same animal would be counted by hundreds of dollars only. In fact, that particular animal might not be worth as much to the farmer as another that might be bought for $100. In respect to milking qualities, a certain bull might be worth $1,000 to the breeder

of a particular sub-family of milkers, while to the farmer, intending to breed him upon a mixed herd, $100 would be his full value.

A cross of "Seventeen" blood might be a good and sufficient reason for the refusal by some special breeder to buy a particular Short-Horn, while to the general breeder it would be no disadvantage; and if the animal were a pure "Seventeen"—descended in a direct line from that importation—the outcome might be richer in beef and milk then the other. Hence it is seen that the farmer who breeds simply for milk or beef, should possess as accurate information concerning what he wants as the breeder of select animals of some particular strain of blood.

XIII. Know what You Breed For.

The breeder for general utility must possess as accurate knowledge as the breeder for special utility, but this knowledge needs to be of a different kind from the other. The breeder for general utility cares not so much that the blood be of some particular strain, as that it shall combine certain points that will bring beef or milk into the produce of his herd, and at the least expense.

What the general breeder is seeking for is such refinement in the head, neck, lungs, digestive organs, blood vessels and limbs, as will tell in the best manner upon his coarser stock. He would be guided by different standards in buying a thoroughbred horse from those he would adopt in buying a draft horse; and in buying an animal solely for beef, the breeder must choose from a different standpoint from that which he takes in buying for milk, labor, or a combination of two or more of these qualities. But in this day of special breeds for special purposes great excellence in all points cannot be expected in one and the same animal. No bull can be a getter of great milkers, great workers, and great beef makers. All these qualities were never combined in one animal and never will be.

XIV. Definition of Terms.

Pure Bred.—The words "pure-bred," "full-blood," and "thoroughbred" have often been stumbling blocks to the uninitiated. A pure race, or race of "pure-bred animals is one of unmixed lineage whose characteristics are well defined, and which breeds pure to the type in every essential particular, including form, color, temper, and of course power to transmit the same. The Devons come nearer to filling all these requirements than any other cattle, and are the best type of a pure breed.

Thoroughbred.—A thoroughbred is the descendant of animals originally of mixed lineage, but which have been inter-bred for so long a time —without further admixture—that they come essentially true to the type

desired. Short-Horns and Herefords among cattle, and racing horses are thoroughbred.

Full-Blood.—Full-blood is a term that should not be used to denote either purity of blood or thorough-blood, though much confusion has existed in the popular use of these three terms. High-grade animals are the produce of pure stock upon common stock, and when pure stock is repeatedly bred to the progeny of such unions the progeny in the course of some generations nearly approaches the pure race in every characteristic and is then called "full-blooded."

Grades.—This term was partly defined in the preceding paragraph. It is used to denote the offspring of pure-blooded or highly-bred animals with those of less breeding, and is generally applied to a cross of pure-blood on common stock.

Cross-Breeding.—The breeding together of animals of different breeds is called cross-breeding, as for instance the union of Hereford and Short-Horn blood. In the first cross, the progeny theoretically possess equal proportions of the blood of sire and dam, but the blood of pure animals being prepotent the progeny will possess more strongly the charateristics of the highly-bred parent than of the other. Hence the advantage of using a bull of pure blood on a herd of mixed blood.

XV. How to Start a Herd.

From among the best cows of the ordinary mixed farm stock, select those possessing in the highest degree the characteristics desired in the offspring. For ten two-year old heifers select a pure-blood yearling bull, that has come of stock noted for getting uniform milkers, if this be the object; or, if beef be the object, he should be of excellent fineness, with great loins, rump and thighs and round barrel-ribs well sprung out, and ribbed close to the hips. The next season's produce should be ten calves, half of which are likely to be heifers. Save these and geld the bulls at the age of about three or four weeks. When these heifers are two years old breed them to their sire, who will then be four years old. The female produce of this union may again be bred to the same bull, and this process may continue to the fourth generation, if the bull lasts so long in the possession of vigor. His last get will thus inherit fifteen sixteenths of the blood of the sire. Select from these the heifers that show the strongest constitutional vigor, and follow this down through the intermediate grades, keeping the families distinct. That is, record the breeding of each animal separately in a book specially prepared for the purpose.

XVI. How the Herd will Grade.

Your herd will grade as follows: The first generation will be half-blood grades; the second three-quarters blood; the third, seven-eighths blood

and the fourth generation, fifteen-sixteenths blood, and will compare favorably with pure-blooded animals, except among critical judges.

XVII. Taking a Line Cross.

In breeding so closely as we have recommended, the exercise of careful judgment is necessary, so that you may cease breeding in-and-in whenever it is found that the constitutional vigor, or feeding qualities of the progeny are impaired. If it be found that the progeny is not improving in all essential qualities select another sire, but one combining the same essential qualities as the discarded sire. This departure will be breeding in line. Breed again with this bull to certain select heifers for two generations, and then take another line cross. In this way a young farmer, who is not able to attempt thoroughbreds, may soon establish a herd that will give the best possible satisfaction as beef makers or milkers, as the case may be. Do not listen to any sentimental talk about incestuous breeding. Incest is not a crime among the lower animals; it is nature's plan with them. Among gregarious animals the strongest males take the herd, to the second and third generation. The object is to throw the good qualities of the sire in a lump, and also to secure the first impress, a most important point, upon the heifer, and to fix this impress by concentration. For, the oftener the dam is bred to the same sire, the more will she be imbued with the blood of the sire of her progeny, through the intercirculation of blood between the dam and the fœtus. This intercirculation, though denied by some, is undoubtedly a physiological fact, proven by many coincidences, if not by absolute demonstration, and fortified by striking resemblances.

XVIII. Some Specimens of Close Breeding.

As showing close in-an-in breeding the first volume of the American Herd Book contains a diagram of the breeding of Comet, from Hubback and Lady Maynard, as follows:

1. Bull, Hubback.
2. Dam of Haughton.
3. Richard Barker's Bull.
4. Cow, Haughton.
5. Bull, Foljambe.
6. Cow, Young Strawberry.
7. Bull, Dalton Duke.
8. Cow, Lady Maynard.
9. Bull, Bolingbroke.
10. Cow, Lady Maynard.
11. Cow, Phœnix.
12. Cow, Young Phœnix.
13. Bull, Favorite.
14. Bull, Comet.

In relation to Favorite or Lady Maynard, Mr. A. B. Allen says: "It was conceded by a company of old breeders in 1812, in discussing the question of the improvement of Short-Horns, that no stock of Mr. Colling's ever equalled Lady Maynard, the dam of Phœnix, and granddam of

Favorite (by Foljambe) and of young Phœnix (by Favorite, her son, upon his own mother,) the dam of Comet 155, so celebrated as having been sold for 1000 guineas ($5000,) also by Favorite, a specimen of as close in-and-in breeding as can perhaps be found on record."

As an example of wonderful depth of in breeding with continued good results, the cow Clarissa may be mentioned. She possessed sixty-three sixty-fourths of the blood of Favorite. Her pedigree runs thus: "Cow Clarissa, roan, calved in 1814; bred by Mr. R. Colling, got by Wellington (680) out of—by Favorite, (852)—by Favorite,—by Favorite—by Favorite—by Favorite—by Favorite—by a son of Hubback."

Wellington, the sire of Clarissa, was also deeply in-bred with the blood of Favorite. Taking the two pedigrees—that of Clarissa and Wellington together—they will read thus:

1. Bull, Hubback.
2. Son of Hubback.
3. Cow, by son of Hubback.
4. Bull, Favorite.
5. 1st cow by Favorite.
6. 2nd cow by Favorite.
7. 3rd cow by Favorite.
8. 4th cow by Favorite.
9. 5th cow by Favorite.
10. 6th cow by Favorite.
11. Clarissa.
12. Bull Wellington, sire of Clarissa.
13. Bull, Comet.
14. Cow, Wildair.
15. Cow, Young Phœnix.
16. Cow Phœnix.
4. Same bull Favorite on the side of Clarissa's sire as on the side of her dam.
17. Bull, Bolingbroke.
18. Granddaughter of Hubback.

There ought to be no fear of following where such results have been attained by others, and these the most eminent and successful breeders of their day. The best successes since their day have also been obtained by continuing the same course to such a degree as intelligent observation showed to be practicable, and especially by breeding in line.

XIX. The Gestation of Cows.

Some years since the writer collected a number of facts in relation to gestation and the influence of the varying times of gestation on the young, to refute a prevalent idea that protracted gestation produced males. Mr. Tessier, for forty years an accurate and acute observer of various animals, gives results in the case of over 575 cows, and these subsequently having been extended to 1,131 cows the extremes were not changed, but results as to averages are as stated below.

Earl Spencer also carefully tabulated the period of gestation of 766 cows, the least period being 220 days; the mean 285 days; and the long-

est 313 days. He was able to rear no calf produced at an earlier period than 240 days. According to Tessier, a cow may carry a calf 321 days and produce it sound; and from the fact that Tessier and Earl Spencer agree almost exactly as to the mean time of gestation, 285 days or nine and a half months may be taken as the average time of gestation of cows, slight variations being allowed from this for different breeds.

It is quite safe to conclude, from the results of experiments with various races of animals, that the period of gestation has no influence whatever upon the sex of the offspring, nor is it probable that the sex of the fœtus has any influence upon the period of gestation. There is a strong probability, however, that heredity in sires and dams, early maturity, ages of the dam and sire, and other causes, may result in longer or shorter periods of gestation.

CHAPTER V.

SHORT-HORN CATTLE.

I. SHORT-HORNED BREEDS.——II. THE OLD TEESWATERS.——III. ORIGIN OF MODERN SHORT-HORNS.——IV. WHAT MADE THEM FAMOUS.——V. THE BULL HUBBACK.——VI. BEEF FROM THE OLD TEESWATERS.——VII. SHORT HORNS IN AMERICA.——VIII. THE GREAT OHIO IMPORTATION.——IX. KENTUCKY AND OTHER IMPORTATIONS.——X. IMPORTATION OF BATES CATTLE.——XI. CANADIAN SHORT-HORNS——XII. WESTWARD MARCH OF THE SHORT-HORN.——XIII. SHORT-HORNS AS BEEF MAKERS.——XIV. THE PATTON FAMILY OF SHORT-HORNS.——XV. GRADE COWS AND STEERS.——XVI. SHORT-HORNS CRITICALLY DESCRIBED——XVII. THE HEAD.——XVIII. THE NECK.——XIX. THE BODY.——XX. THE LEGS SHORT AND STRAIGHT.——XXI. THE LOIN BROAD.——XXII. WIDE IN THE CROPS.——XXIII. THE BACK STRAIGHT AND BROAD.——XXIV. THE RIBS BARREL-SHAPED.——XXV. THE TOUCH.——XXVI. THE HIDE.——XXVII. THE HAIR.——XXVIII. THE COLOR.——XXIX. BEEF POINTS ILLUSTRATED.——XXX. SCALE OF POINTS FOR SHORT-HORN BULLS.——XXXI. SCALE OF POINTS FOR SHORT-HORN COWS.

I. Short-Horned Breeds.

Of the short-horned breeds of England of 100 years ago, represented by the Durham or Teeswater, the Yorkshire, the Lincolnshire and the Holderness, all are probably descended from a common origin. The descendants of the old Durham and the Channel Islands cattle, (Jersey and Alderney notably) are all that can now be distinctively recognized as having attained special celebrity. The name Short-Horn is not now used to designate any but the descendants of the Durham cattle, as improved, and is now applied distinctively only to them.

The Jerseys will be treated of in their proper chapter as among the breeds entitled to distinguished merit, the Short-Horns as standing at the head of established beef breeds being under consideration here.

II. The Old Teeswaters.

There has existed from a remote period in the region of the Teeswater (one of the small rivers of England), a race of short-horned cattle that were possessed of good feeding qualities combined with early maturity and thick flesh, as weights were considered 200 years ago. Their origin has been variously stated, but nothing is truly known of it and only traditionary statements are extant.

III. Origin of Modern Short-Horns.

The origin of the modern Short-Horn is not fully agreed on, except that they have descended directly from the Teeswaters or old Durhams on one side, and that they were gradually improved by breeders who recog-

nized their excellence. In the latter part of the last century, such breeders as the Collings (Charles and Robert), Sir Henry Vane, Col. Trotter and Mr. Mason, and—early in the present century—Mr. John Stevenson, Mr. Bates, and Mr. Booth proceeded scientifically and systematically to improve them. Mr. Bates died in 1849, at which time the breed had attained a world-wide celebrity, and this steadily grew, until the extravagant sums of $20,000, $30,000 and even $40,000 were bid for single animals. To-day there are none of the cow kind that bring such prices for single animals.

IV. What Made Them Famous.

Youatt and Martin say the circumstance which first brought these wonderful cattle into special notice was the production of the "Durham ox," which was exhibited all over England, and at the age of eleven years dislocated his hip and was killed, weighing 3,780 pounds, after having been carried from place to place in a "jolting carriage" for seven years, or since he was five years old. In February, 1801, at five years old he weighed 3,024 pounds. This extraodinary weight, our authority says, did not arise from his superior size, but from the excessive ripeness of his points.

V. The Bull Hubback.

Probably no single animal in the history of Short-Horns has exercised so great an influence for good on this breed as the bull Hubback. Of him Mr. Youatt says: "The following account of Hubback we had from Mr. Waistell, of Alihill, who, although his name does not appear conspicuously in the Short-Horn Herd Book, deserves much credit for his discrimination here. He used to admire this bull as he rode by the meadow in which he grazed; and at length attempted to purchase him. The price asked, *8l.*, seemed much, and the bargain was not struck. Still he longed for the beast; and happening to meet Mr. Robert Colling near the place, asked his opinion of the animal. Mr. Colling acknowledged that there were good points about him; but his manner induced Mr. Waistell to suspect that Mr. Colling thought more highly of the bull than his language expressed, and he hastened the next morning, concluded the bargain, and paid the money. He had scarcely done so before Mr. R. Colling arrived for the same purpose, and as the two farmers rode home together they agreed that it should be a joint speculation.

"Some months passed by, and either Mr. Waistell's admiration of the bull cooled, or his partner did not express himself very warmly about the excellences of the animal, and Messrs. Waistell and R. Colling transferred Hubback to Mr. C. Colling, who, with the quick eye of an experienced breeder, saw the value of the beast. Mr. Waistell expressed to us

(October, 1832) his regret at having been induced to part with him, and his extreme disappointment that when Hubback was so sold, Mr. Charles Colling confined him to his own stock, and would not let him serve even one of Mr. Waistell's cows."

VI. Beef from the Old Teeswaters.

That the original Teeswaters and their early descendants were good cattle, and a most excellent foundation to work on, the following record of weights from 1791 to 1822 will show: In 1791, of an ox four years and ten months old, the four quarters weighed 145 stones, 3 lb.; tallow, 24 stones, 7 lb., (2376 lbs.) A steer, under four years old; four quarters, 106 stones; tallow, 19 stones, 7 lb., (1757 lbs.) 1814.—A steer, three years and nine months old; four quarters, 101 stones, tallow, 15 stones, (1624 lbs.) 1815.—A steer, three years eleven months old; four quarters, 112 stones, 7 lb.; tallow, 26 stones, (1939 lbs.) A heifer, three years eight months old; four quarters, 89 stones, (1246 lbs.) 1817.—A steer, three years two months old; four quarters, 95 stones, 10 lb.; tallow, 17 stones, 10 lb. (1528 lbs.) 1822.—An ox, four years and a half old; four quarters, 135 stones; tallow, 21 stones, (2184 lbs.)

VII. Short-Horns in America.

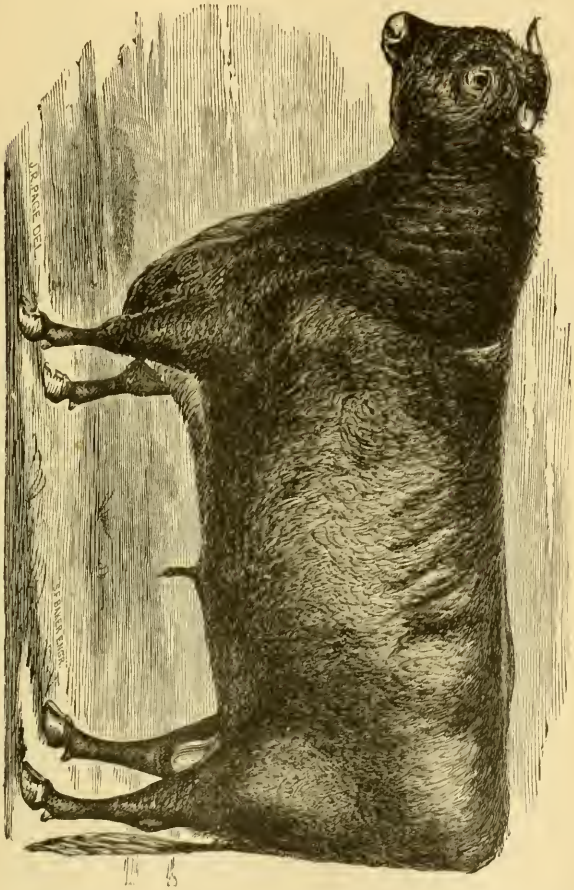
Mr. Allen, the editor of the Short-Horn Herd Book, in his work on American cattle, gives an exhaustive account of importations of Short-Horns into the United States, from which we gather the following record of the more important importations:

Soon after the Revolutionary war, a few cattle supposed to be pure Short-Horns, were brought into Virginia. These were said to be well-fleshed animals, and the cows remarkable for milk, giving as high as thirty-two quarts in a day. Some of the produce of these cattle, as early as 1797, were taken into Kentucky by Mr. Patton, where they were called the "Patton stock." They were well cared for, and made a decided improvement in the cattle of the Blue grass country.

In 1815–16, Mr. Cox, an Englishman, imported a bull and two heifers into Rensselaer county, New York. They were followed in 1822 by two bulls, imported by another Englishman named Hayne. Descendants from this Cox stock were said to be bred pure, and afterwards crossed by Mr. Hayne's bulls. The stock now exists in considerable numbers and of good quality, in that and adjoining counties.

In 1817, Col. Lewis Sanders, of Lexington, Kentucky, made an importation of three bulls and three heifers from England. They were of good quality and blood, and laid the foundation of many excellent herds in that State. In 1818, Mr. Cornelius Cooledge, of Boston, Massachusetts, imported a yearling heifer—"Flora"—and a bull—"Cicero"—

into that city, from the herd of Mr. Mason, of Chilton, in the county of Durham, England. These were carefully bred, and many of their descendants are now scattered throughout several States.

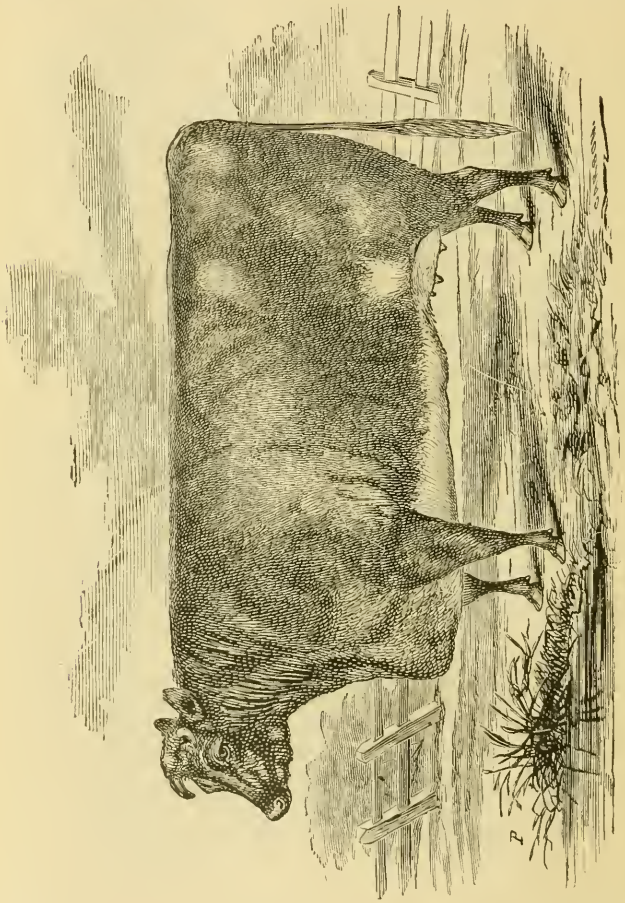


SHORT-HORN BULL OF 1840.

Shortly previous to 1821, the late John S. Skinner, of Baltimore, Maryland, imported for Governor Lloyd, of that State, a bull—"Champion"—and two heifers—"White Rose" and "Shepherdess"—from the

herd of Mr. Champion, a noted English breeder. From these, several good animals descended, some of which are now known.

In 1823, Mr. Skinner also imported for the late Gen. Stephen Van Rensselær, of Albany, New York, a bull—"Washington"—and two



SHORT-HORN COW, "ROSAMOND."

heifers—"Conquest" and "Pansey"—from the same herd of Mr. Champion. Conquest did not breed; Pansey was a successful breeder, and many of her descendants are now scattered over the country.

During the years 1822 to 1830, Mr. Charles Henry Hall, of New York, imported several Short-Horn bulls and cows, from some of the best English herds. Their descendants are now scattered through several good herds.

YEARLING SHORT-HORN BULL.

In 1824 the late Col. John Hare Powell, of Philadelphia, Pa., commenced importations, and for several years continued them with much

spirit and judgment. He bred them assiduously at his fine estate at Powelton, near the city, and sold many to neighboring breeders, and to go into Ohio and Kentucky, where many of their descendants still remain.

In the year 1833, the late Mr. Walter Dun, near Lexington, Ky., imported a bull and several valuable cows from choice herds in Yorkshire, England. He bred them with much care, and their descendants are now found in many good western herds.

VIII. The Great Ohio Importation.

But the first enterprise in importing Short-Horns upon a grand scale was commenced in 1834, by an association of cattle breeders of the Scioto Valley, and its adjoining counties, in Ohio. They formed a company with adequate capital, and sent out an agent who purchased the best cattle to be found, without regard to price, and brought out nineteen animals in one ship, landed them at Philadelphia, and drove them to Ohio. Further importations were made by the same company, in the years 1835 and 1836. The cattle were kept and bred together in one locality, for upwards of two years, and then sold by auction. They brought large prices—$500 to $2,500 each.

IX. Kentucky and other Importations.

In 1837-8-9, importations were made into Kentucky, by Messrs. James Shelby and Henry Clay, Jr., and some other parties, of several well-selected Short-Horns, some of which were kept and bred by the importers, and the others sold in their vicinity.

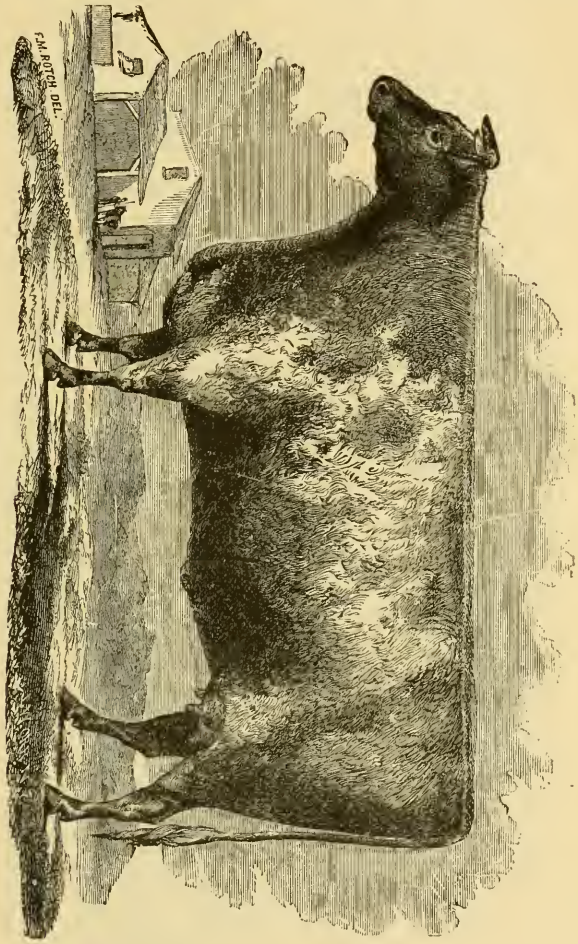
In 1837-8-9, Mr. Whitaker sent out to Philadelphia, on his own account, upwards of a hundred Short-Horns, from his own and other herds, and sold them at auction. They were purchased at good prices, mostly by breeders from Pennsylvania, Ohio, and Kentucky, and distributed widely through those States.

About the year 1839, Mr. George Vail, of Troy, N. Y., made an importation of a bull and heifer, purchased of Mr. Thomas Bates, of Kirkleavington, the first cattle from that particular herd which had been introduced into the State. A few years later, he purchased and imported several more cows from the herd of Mr. Bates, crosses of his "Duchess" and other families. He bred them with success and widely distributed their blood.

X. Importation of Bates Cattle.

Mr. Thomas Bates, a distinguished Short-Horn breeder in England, died in 1849. His herd, fully equal in quality to any in England, was

sold in 1850. The choicest of them—of the "Duchess" and "Oxford" tribes—fell mostly into the hands of the late Lord Dacie. He was a skillful breeder, and of most liberal spirit, and during the brief time he

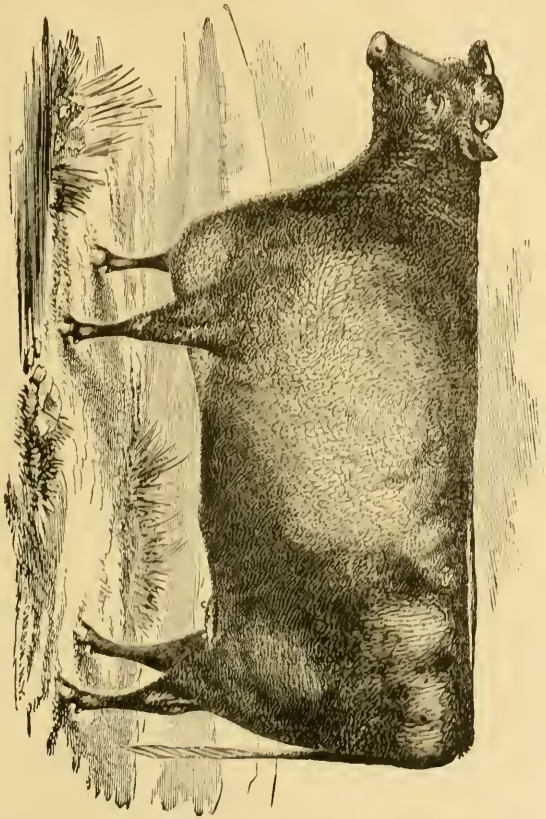


SHORT-HORN COW.

held them the reputation of the Bates stock, if possible, increased. Within three years from the time of the sale of Mr. Bates' herd, Lord

SHORT-HORN BULL.

Dacie died. In 1853, peremptory sale of his stock was widely advertised. Allured by the reputation of his herd, several American gentlemen went over to witness it. The attendance of English breeders was very large, and the sales averaged higher prices in individual animals than had been reached since the famous sale of Charles Colling in 1810. Mr.



A YOUNG SHORT-HORN COW.

Samuel Thorne, of Duchess county, N. Y., bought several of the best and highest priced animals, of the "Duchess" and "Oxford" tribes, and added to them several more choice ones, from different herds. Messrs. L. G. Morris, and the late Noel J. Becar, of New York, bought others of the "Duchess," and "Oxfords," to which they added more from othe-

choice herds. These "Bates" importations have since been bred so successfully by their holders here, that several young bulls and heifers have been purchased by English breeders, and sent over to them at good prices, where they are highly valued.

In 1852–3–4, several spirited companies were formed in Clinton, Madison, and other counties in Ohio, and in Bourbon, Fayette, and some other counties of Kentucky, and made importations of the best cattle to be found in the English herds, and after their arrival here, distributed among their stockholders. Mr. R. A. Alexander, of Kentucky, also, during those years, made extensive importations of choice blood for his own breeding, so that in the year 1856, it may be said that the United States possessed, according to their numbers, as valuable a selection of Short-Horns as could be found in England itself.

XI. Canadian Short-Horns.

Keeping pace with the States, a number of enterprising Canadians, since the year 1835, among whom may be named the late Mr. Adam Fergusson, Mr. Howitt, Mr. Wade, the Millers, near Toronto, Mr. Frederick Wm. Stone, of Guelph, and Mr. David Christie, of Brantford, in Canada West, and Mr. M. H. Cochrane and others in Lower Canada, have made sundry importations of excellent cattle, and bred them with skill and spirit. Many cattle from these importations, and their descendants, have been interchanged between the United States and Canada, and all may now be classed, without distinction, as American Short-Horns.

XII. Westward March of the Short-Horns.

In the West, the North-west and in the South-west, as fast as the settlement of the country allowed, the Short-Horns were every-where introduced, and within the last fifteen years, annual sales have been made at important cities and on the farms of the wealthier breeders, where the surplus stock is bid off at auction. These sales are attended by buyers from all parts of the country, especially by breeders from the newer settlements West, until now Minnesota, Nebraska, Kansas, Colorado and even the territory of Dakota, have most excellent herds of their own. In addition to this, Short-Horn bulls are shipped by the car-load to the great herding grounds of the far western plains to improve the stock there.

XIII. Short-Horns as Beef-Makers.

It is to be regretted that we no longer have the fine milking strains of Short-Horns, that were so abundant thirty years ago. Nevertheless, their places are amply supplied by the Jerseys, the Ayrshires and the Dutch Friesian or Holstein cattle

If the Short-Horns fail as milkers they have been wonderfully improved as beef-makers, and as wonderfully developed in point of early maturity, so that they are now produced ripe for the butcher at three years old, and are quite fit for killing at any age from yearlings up.

While they are wonderful as beef-makers, they certainly are the handsomest cattle, to the eye, of any in the known world. They have great thickness of carcass, and the prime points especially are full. The offal is no more than in ordinary steers that will not attain more than half their weight. They have been sneeringly called "the gentleman's steers." The breeding of them is certainly patronized by the wealthy, as objects of beauty, and butchers seem to be especially anxious to get the ripe ones for Christmas beef. In the older settled parts of the country there are few cattle but show more or less of this almost universally admired blood.

XIV. The Patton Family of Short-Horns.

Soon after the Revolutionary war, as already stated, cattle, supposed to have been pure-bred Short-Horns, were brought to Virginia. The progeny of some of these cattle were taken to Kentucky by a gentleman named Patton, from whence, in course of time, they became widely disseminated as Patton stock—a name which was even corrupted into "patent stock." This was not a misnomer however, since, as we knew them over forty years ago, they were heavy cattle, that ripened at an early age, for that day, and among them were many remarkable milkers. They were somewhat coarse as compared with the Short-Horns of to-day, but thick-meated, broad-loined, round-barrelled animals, good at the pail; and, on the butcher's block, they gave large carcasses of excellent beef.

XV. Grade Cows and Steers.

A report in the fifth volume of the "Transactions of Massachusetts," gives the well-authenticated statement of Mr. Robinson of Barre, from which we gather the following interesting facts: The cows under trial were half and three-quarters bred. Seven of them yielded, during the first seven days in June, 2,207 pounds of milk, averaging forty-five pounds per diem to each cow. From this milk 232 pounds of cheese was made, averaging one pound of cheese to nine and a half pounds of milk. The same cows gave during the three following days 955 pounds of milk, from which forty-one pounds nine ounces of butter were made, averaging one pound of butter to twenty-three pounds of milk. It will be seen that the milk that makes one pound of butter will make two and a half pounds of cheese. These cows had no extra feed during the trial, having been turned to pasture on the 15th of May. This instance is selected not as a very extraordinary performance, but as a well-authenticated and carefully-conducted experiment.

So far as the grade steers are concerned they are well known to be thrifty, easily-fed animals that mature fully a year in advance of the native cattle, from which they are in part descended.

XVI. Short-Horns Critically Described.

For a full and graphic description of all the points which go to make up a high-caste Short-Horn, there is no better authority than the writings of Mr. Rotch of New York, and Mr. A. C. Stevenson, formerly President of the Indiana Short-Horn Breeders' Association. By the aid of the careful analysis made by these critical judges, the many excellent and valuable qualities of the breed may be readily estimated. The majestic size, proud carriage and beautifully variegated colors of the Short-Horn render him easily recognized by the merest tyro. But few who thus admire and recognize them are aware how many qualifications go to make up this splendid whole, or how carefully each point has been weighed and discussed, and its relative value decided; how the useful parts are divided from the ornamental and fashionable, and how systematically the whole has been carried out.

XVII. The Head.

The high-caste Short-Horn should have a small head, a broad, flat forehead, with no projection of the frontal bones; the face should be well cut out below the eyes, tapering to a fine muzzle with open nostrils. The nose must be flesh or chocolate colored; any discoloration hinting towards black or blue is very objectionable, though occasionally seen in some of the highest bred families. The eye must be bright, prominent, and yet placid; a small, piggish or hollow eye, or one showing viciousness or nervousness, is alike to be avoided, the latter indicating a bad feeder almost invariably. The circle around the eyes should be of a bright yellow or flesh color. As a very large ear indicates sluggishness, one of medium size is preferable. The horns should be well set on, curving forward, not too heavy, and of a clear, waxy yellow color at the base, though this waxy color is not universally deemed essential—some claim that the horns should be flat.

XVIII. The Neck.

The neck is moderately long, clean in the throat, and running neatly into the shoulders, which should not be too prominent at the points, nor too wide at the top, else the crops will be certain to seem defective; they should mould nicely into the fore-quarters, and be well covered with flesh on the outside. The neck-vein should be well filled up with flesh, and form on smoothly to the shoulder points. The chest must be broad and

deep, and full back of the elbows, which secures a good girth and consequent room for the most important vital organs. The brisket should be full and broad rather than narrow and projecting; it is of inferior quality as beef, yet, as a point of beauty and as indicating a propensity to fatten, must not be overlooked. A thin, broad neck is sure to indicate weakness and poor feeding qualities. Animals having such may well be avoided as breeders.

XIX. The Body.

The body should be square, massive and symmetrical. The line of the back should be straight; the line of the belly nearly so, swelling a little behind the ribs; the flank low; the ribs barrel-shaped; the loins wide, and the rump long and wide. The back should be wide, and the thigh should be long and wide; the legs short and comparatively small, or at least not coarse; tail light; hair soft and fine. The color should be red or white, or a mixture of the two, as roan or pied. The body should be nearly a square. A very lengthy bullock never fattens so readily as a short one, for he does not possess all the elements of health and vigor in the same degree as the shorter and more compact animal.

XX. The Legs Short and Straight.

The body should be set on short legs which should be straight and well under the animal; the fore legs should be small in the bone below the knee, whilst the forearm must be broad and tapering downwards, fitting level into the girth; the hind legs must be nearly straight. If the hocks are too much bent, turn inward, or not well under the body, it not only gives an awkward gait in walking, but is generally a sign of weakness.

XXI. The Loin Broad.

The loin must be broad and well carried forward into the crops, and covered with thick flesh moulding nicely on to the hips, which though wide must not be too prominent, but slope away gradually to the rump or side bones at the tail. A quarter badly filled up between hips and rumps or scooped-out, as it is termed, is very objectionable. The back must be level from neck to tail, with no drops back of the shoulders, nor any rise where the tail is set on: the rumps must be well laid up but not too high, else when the animal is fat we shall have those large masses of fat aggregated about them so common among the breed some years since, but now deservedly stigmatized as bad. The twist should be well filled out in the seam, wide and deep, the outside thigh full, the flank deep, and forming with the fore-flank and belly (the latter well supported by its plates) a parallel line with the animal's back.

XXII. Wide in the Crops.

The animal broad in the crops has a better back; but it is also evidence of a better rib beneath the shoulder-blade, giving greater width to the chest within, and consequently greater play to the lungs. This position of the shoulder-blade enables the legs to be brought more gracefully under the chest beneath. There are some beasts whose fore legs stand so wide apart that they very much resemble two sticks stuck into a large pumpkin. Such animals are considered awkward and inconvenient at least.

XXIII. The Back Straight and Broad.

A broad back affords valuable roasting pieces, and will be the delight of the butcher. The straight back affords a better spinal column, and gives the proper space to the cavities beneath, which, as we have just seen, are occupied by the most important organs. A straight line also gives to the ribs a more graceful as well as a more convenient attachment.

XXIV. The Ribs Barrel-Shaped.

The ribs rising well from the spine, giving to the body a round or barreled shape, gives much more room to the organs within—the heart and lungs—than there would be if the ribs descended in such a manner as to give a flat side. A beast with flat sides, and consequently a narrow throat, will lack greatly in vigor and health, and all the essential qualities that constitute a good bullock. A bad rib gives poor space to the abdominal organs which lie immediately behind those of the chest, unless the belly is greatly sagged, which is generally the case.

XXV. The Touch.

By handling or the touch, butchers ascertain beforehand the quality of the flesh. By it the breeder ascertains the aptitude to fatten as well as the quality and quantity of flesh that the animal will carry. Of all the qualities of the ox, this is probably the most difficult to understand. It is the peculiar sensation of softness and elasticity that is produced by the pressure of the hand on different parts of the body. This sensation depends, in part, upon a large cellular development beneath the skin and between the muscles, and in part upon the muscular structure, adapting itself to the duties it has to perform. It is very common to find a softening of the muscular fibre as an accompaniment or a precursor of disease that may mislead. The same may be observed in the aged of both man and beast. What is 'touch,' or what is it to 'handle well?' How is it to be distinguished from that which portends bad health and old age? By its elasticity—its power to replace the parts when pressed—a springy sensation.

It will require much practice to become an adept in this knowledge. Still, many useful lessons may be daily had by the examination and handling of one's own stock. Comparative handling will afford much assistance. Take those animals that are known to accumulate fat readily and largely, as the opossum or the bear, or any other known to take on fat readily, and you will find a peculiarly soft and mellow 'touch.'

XXVI. The Hide.

The skin should be thick, soft and elastic—fitting alike either a poor or fat ox. A lean animal, with an inelastic skin stretched upon him, could not fatten for the want of space to expand in. But with an elastic skin he may be swelled to great dimensions in what seemed to be but a covering for his bones. The skin performs very important functions in the animal economy. It is not only a covering for all the parts beneath it, but it is the seat of a vast system of minute blood vessels and capillaries, of exhalents and absorbents. A vast nervous tissue centers here that renders the skin sensitive in the highest degree. The great vital worth and importance of the skin may be readily appreciated by any injuries done it. The rapidity with which extensive burns destroy life may serve as a sufficient illustration. "Destroy my skin, and you shall have my bones also."

XXVII. The Hair.

The hair should be thick, soft, mossy and fine, forming a protection against inclemencies of weather. Fine hair is an evidence of a finely organized skin, a skin exquisitely finished in its whole structure of minute vessels and tissues. A skin thus delicately organized is also evidence that other organs are alike constructed. Nature in all her parts undoubtedly produces a correspondence, so that if one part is of a peculiar structure, either fine or coarse, other parts are apt to correspond. Parts seen may be considered indicative of parts not seen. It may be permitted to add that in all the scrub cattle that I have grazed and fed, I have never found one with fine silky hair that did not fatten well and make a desirable bullock.

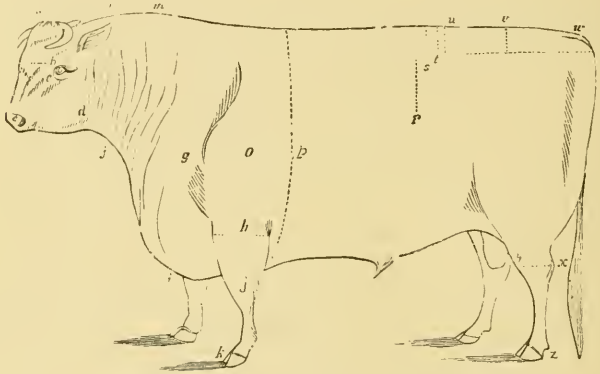
XXVIII. The Color.

As regards color, the latitude is very great, from deep blood-red through all the intermediate shades and mixtures to pure white, but any other colors, as brown, black or dun, are never met with in thoroughbreds. Fashion has vindicated the rich red and purple roan as the most desirable colors, and after them red. White is sometimes objected to, under the impression that it is apt to spread through a herd and overpower the other colors; but this fear is more common in this country

than in England, where white bulls are often used. Red and white, in blotches, with defined edges not running into roan, is disliked, and the term patchy is applied to it. This discrimination, however, as regards color, is entirely arbitrary, animals of equal excellence and breeding being found of all these colors.

XXIX. Beef Points Illustrated.

In the accompanying outline illustration of the points of a Short-Horn bull the letters *a*, *b*, *c*, *d*, *f*, *h*, *m*, *j*, *k*, *x*, *y*, *z*, represent the inferior parts: from the girth *p*, back, including *r*, *s*, *t*, *u*, *v*, the superior parts.



POINTS OF SHORT-HORN BULL.

From this it will be easy to understand the points and the respective numbers given in the tabulated scale of points as authoritatively stated in the American Herd Book

XXX. Scale of Points for Short-Horn Bulls.

	POINTS.
ART. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten; sire a good stock-getter, dam a good breeder; and giving a large quantity of milk, or such as is superior for making butter or cheese. - - - - - -	7
ART. 2.—Head muscular and fine; the horns fine and gradually diminishing to a point, of a flat rather than a round shape at the base, short and inclined to turn up, those of a clear, waxy color to be preferred, but such as are of a transparent white,	

and tinged with yellow, admissable; ears small, thin and covered with soft hair, playing quick, moving freely; forehead short, broad, especially between the eyes, and slightly dished: eyes bright, placid and rather prominent than otherwise, with a yellow rim around them; lower part of the face clean, dished and well developing the course of the veins; muzzle small, nose of a clear orange or light chocolate color: nostrils wide and open: lower jaw thin: teeth clean and sound. - - 5

Art. 3.—Neck fine and slightly arched, strongly and well set on the head and shoulders, harmoniously widening, deepening and rounding as it approaches the latter point; no dewlap. - 2

Art. 4.—Chest broad, deep and projecting, the brisket on a lower line than the belly. - - - - - - - - - 5

Art. 5.—Shoulders broad, strong, fine and well placed; forelegs short, straight, and standing rather wide apart than narrow: fore-arm muscular, broad and powerful, slightly swelling and full above the knee: the bone fine and flat: knees well knit and strong: foot flat, and in shape an oblong semicircle; horn of the hoof sound and of a clear waxy color. - - - - - 2

Art. 6.—Barrel round and deep, and well ribbed up the hips. - 4

Art. 7.—Back short, straight and broad from the withers to the setting on of the tail; crops round and full; loins broad; huckle bones on a level with the back; tail well set, on a level with the back, fine and gradually diminishing to a point, and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - - - - - - - - 4

Art. 8.—Hind quarters from the huckle to the point of the rump well filled up: twist well let down and full; hind legs short, straight, and well spread apart, gradually swelling and rounding above the hock; the bone fine and flat below; legs not to cross each other in walking, nor to straddle behind. - - - 3

Art. 9.—Skin of medium thickness, movable and mellow; a white color is admissable, but rich cream or orange much preferable; hair well covering the hide, soft and fine, and if undercoated with soft, thick fur in winter, so much the better; color, pure white, red roan, bright red, or reddish yellow and white. (A black or dark brown nose or a rim around the eye, black or dark spots on the skin and hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - - 3

Art. 10.—Good handling. - - - - - - - - - 4

Art. 11.—Sure stock-getter. - - - - - - - - 4

ART. 12.—Stock, when made steer, certain to feed kindly for beefers at any age, and make prime beef. - - - - - - 5
ART. 13.—General appearance. - - - - - - - 2

Perfection. - - - - - - - - - - - 50

XXXI. Scale of Points for Short-Horn Cows.

POINTS.

ART. 1.—Purity of breed on male and female side; sire and dam reputed for docility of disposition, early maturity and aptitude to fatten. Sire a good stock-getter. Dam a good breeder; giving a large quantity of milk, or such superior for making butter or cheese. - - - - - - - - - 7

ART. 2.—Head small and tapering; long and narrower in proportion than that of the bull. Horns fine and gradually diminishing to a point; of a flat rather than of a round shape at the base; short, and inclined to turn up; those of a clear waxy color to be preferred; but such as are of a transparent white, slightly tinged with yellow, admissible. Ears small, thin, and well covered with soft hair; playing quick, moving freely. Forehead of good breadth between the eyes, and slightly dished. Eyes bright, placid, and rather prominent than otherwise, with a yellow rim round them. The lower part of the face clean, dished, and well developing the course of the veins. Muzzle small; nose of a clear bronze, or light chocolate color—the former much preferred. Nostrils wide and well opened. Lower jaw thin. Teeth clear and sound. - - - - - - 5

ART. 3.—Neck fine and thin, straight, and well set on to the head and shoulders, harmoniously widening, deepening, and slightly rounding in a delicate feminine manner as it approaches the latter point. No dewlap. - - - - - - - - 2

ART. 4.—Shoulders fine and well placed. Fore legs, short straight and well spread apart. Fore-arm wide, muscular, slightly swelling, and full above the knee; the bone fine and flat below. Knees well knit and strong. Foot flat and in shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. - - - - - - - - - - - 2

ART. 5.—Chest broad, deep and projecting—the brisket on a lower line than the belly. - - - - - - - - - - 5

ART. 6.—Barrel round, deep and well ribbed up to the hips. - 5

ART. 7.—Back short, strong, straight from the withers to the setting of the tail. Crop round and full. Loin broad. Huckle bones on a level with the back. Tail well set, on a level with

the back or very slightly below it; fine and gradually diminishing to a point; and hanging, without the brush, an inch or so below the hock, at right angles with the back. - - - 4

ART. 8.—Hind quarters from the huckles to the point of the rump long and well filled up. Twist well let down and full. Hind legs short, straight and well spread apart; gradually swelling and rounding above the hock; the bone fine and flat below. Foot flat, and in shape of an oblong semi-circle. Horn of the hoof sound, and of a clear waxy color. Legs not to cross each other in walking, nor to straddle behind. - - - - - 3

ART. 9.—Udder broad, full, extending well forward along the belly, and well up behind. Teats of a good size for the hand; squarely placed with a slight oblique pointing out; wide apart; when pressed by the hand the milk flowing from them freely. Extra teats indicative of good milking qualities, but should never be milked, as they draw the bag out of shape. Milk veins large and swelling. - - - - - - - - - - - 4

ART. 10.—Skin of a medium thickness: movable and mellow; a white color is admissible, but a rich cream or orange much preferable. Hair well covering the hide; soft and fine, and if undercoated with soft, thick fur in the winter, so much the better. Color pure white, red, roan, bright red, red and white, spotted roan, or reddish and yellow and white. (A black or dark brown nose, or rim around the eye, black or dark brown spots on the skin and the hair decidedly objectionable, and indicative of coarse meat and bad blood.) - - - - 3

ART. 11.—Good handler. - - - - - - - - - 4

ART. 12.—Sure and good breeder. - - - - - - - 4

ART. 13.—General appearance. - - - - - - - 2

Perfection. - - - - - - 50

CHAPTER VI.

THE JERSEYS, ALDERNEYS AND GUERNSEYS.

1. A FASHIONABLE BREED.——II. THE GUERNSEYS.——III. THE ALDERNEY IN YOUATT'S TIME.——IV. THE JERSEY OF TO-DAY.——V. CROSSING THE JERSEYS.——VI. THE JERSEY DESCRIBED.——VII. MILK MIRRORS.——VIII. GUENON'S THEORY OF MILK MIRRORS.——IX. THEIR PRACTICAL UTILITY.——X THE ESCUTCHEON MARKS.——XI. GOOD MILKERS IN ALL BREEDS.——XII. VALUE OF HEREDITY.——XIII. INFLUENCE OF GOOD DIGESTION AND ASSIMILATION.——XIV. THE MILK VEINS.——XV. THE UDDER AND TWIST VEINS.——XVI. MR. SHARPLESS' OPINION.——XVII. SYMMETRY ESSENTIAL WHATEVER THE BREED.——XVIII. THE JERSEY NOT A DAIRY COW.——XIX. SCALE OF POINTS FOR JERSEY COWS AND HEIFERS——XX. RULES IN AWARDING PRIZES.——XXI. SCALE OF POINTS FOR JERSEY BULLS.——XXII. ESTIMATING THE VALUE OF POINTS.——XXIII. COLOR AND SIZE.——XXIV. FROM A PRACTICAL STAND-POINT.

I. A Fashionable Breed.

Within the last fifteen years, the Jersey, Alderney and Guernsey cattle, second in importance of the short-horned breeds of Great Britain, have acquired great celebrity, not so much for the quanity of the milk they give, as for its exceeding richness in cream, and the excellence of the butter made therefrom. Those originally brought from the islands of Jersey and Alderney are now called Jerseys, just as all Dutch cattle have been called Holsteins, while the Guernsey cattle are kept separate and distinct, under the proper name of the island from which they came.

II. The Guernseys.

While the Jerseys and Alderneys have the most admirers, especially among fashionable breeders, from their deer-like forms and general air of elegant lightness, the Guernseys are coming into prominence as being larger, better-built, (that is, not so angular,) and better feeders; for it must be confessed that the Jersey cow, for its size, is a great consumer.

The Guernsey cow is also a larger producer of milk, though it is averred by the Jersey breeders that it is not so rich in quality. Jersey cattle, however, vary much in this respect, and it is certain that the Guernsey cows are growing more and more into favor every year as butter and milk producing cows.

III. The Alderney in Youatt's Time.

Youatt says of this breed, which he classes with the cattle of Normandy, that they are from the French continent; that the cattle of Normandy are larger and have a greater tendency to fatten; that others are

from the islands of the French coast, but that all of them, whether from the continent or islands, pass under the common name of Alderney. Youatt also adds, on the authority of Mr. Parkinson, who seems to have been a prejudiced observer, that, "The Alderney, considering its voracious appetite—for it devours almost as much as a Short-Horn—yields very little milk," but admits the milk to be rich in quality, though "it is not rich enough, yielding the small quantity she does, to pay for what it costs." If this be true, the Jersey has improved fully as much within the last fifty years as any other breed.

IV. The Jersey of To-Day.

Be the statements of the authorities quoted what they may, the Jersey of to-day is a very different animal from that which they describe. That the Jerseys are large feeders for their size there is no doubt, and that they give the richest milk of any known breed is quite as certain. That some of them, at least, give large quantities of milk, the following extract from the American Encyclopædia of Agriculture will show:

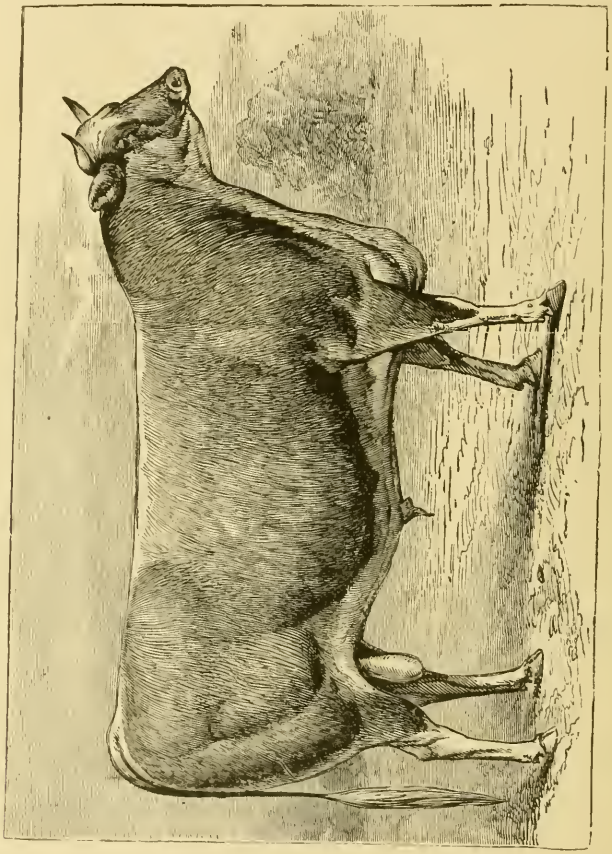
"The butter from the cows is very rich in cream and deep yellow in color, so much so that a few cows in a herd will decidedly change the color of the butter of the whole herd. The percentage of cream to milk varies from eighteen to twenty-five per cent., and the proportion of butter to cream varies from 3.70 to 8.07 in 100 parts. Twenty-six quarts per day has been recorded as the product of an individual cow, and fourteen pounds of butter per week. Sixteen quarts per day may be regarded as a good yield, and when we take into consideration the light weight of the cow, and the fact that the milk will yield from one-quarter to one-sixth of the richest cream, we need not wonder that these gentle and deer-like cattle have become universal favorites as family cows."

Our own observation is that twelve quarts a day may be considered a good average yield of milk, from the pure-bred animals—an average fully one-third more than that of good native herds.

V. Crossing The Jersey.

Crossing the Jerseys with other improved breeds has not resulted satisfactorily. Their value, however, is priceless when crossed upon good milkers from native herds. They have added largely to the quality of the milk of the inferior stock; and crosses of the Jersey bull upon the ordinary native cows of a district, have not only imparted richness to the milk, but have resulted in an increased flow. Their sole use is among those who wish exceedingly rich milk, and, whatever the strain, we think no advantage will be found in crossing them on any of the beef breeds. They are milking cattle, and their legitimate use is to supply the demands of people who want quality, and not quantity of milk.

The bulls may improve the native milking stock of the country, and whatever variety is used, whether those from the Isle of Jersey, Alderney or Guernsey, use only pure bulls. Do not take a grade-bull at any price; those purely bred are now sufficiently plenty, so that they can be

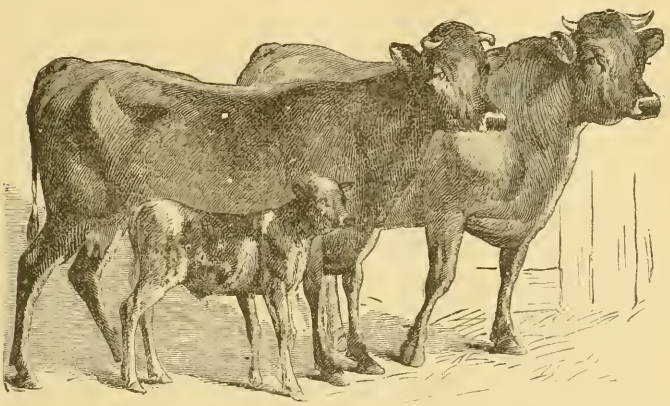


JERSEY BULL.

had at reasonable prices. The pure bulls are prepotent in perpetuating rich milking qualities. The grades are not. If an additional reason were wanted, please remember that the produce of a pure animal on one not of improved blood is a half-blooded calf. The produce of a half-blood on native cattle would be only one-quarter blood.

VI. The Jersey Described.

Mr. Lewis F. Allen, a conscientious and accurate historian of cattle, but who, it must be confessed, has something of a prejudice in favor of the (to him) favorite Short-Horns, accurately describes the Jersey, as follows: "Beginning with the head—the most characteristic feature—the muzzle is fine; the nose either dark brown or black, and occasionally a yellowish shade, with a peculiar mealy, light-colored hair, running up the face into a smoky hue, when it gradually takes the general color of the body. The face is slightly dishing, clean of flesh, mild and gentle in expression; the eye clear and full, and encircled with a distinct ring of the color of the nose; the forehead bold; the horn short, curving inward



JERSEY BULL, HEIFER AND CALF.

and waxy in color, with black tips: the ear sizable, thin, and quick in movement. The whole head is original, and blood-like in appearance, —more so than in almost any other of the cattle race,—reminding one strongly of the head of our American elk. The neck is somewhat depressed—would be called ewe-necked by some—but clean in the throat, with moderate or little dewlap; the shoulders are wide and somewhat ragged, with prominent points, running down to a delicate arm, and slender legs beneath. The fore-quarters stand rather close together, with a thinnish, yet well developed brisket between. The ribs are flat, yet giving sufficient play for good lungs; the back depressed and somewhat hollow; the belly deep and large; the hips tolerably wide; the rump and tail high; the loin and quarter medium in length; the thigh thin and

deep; the twist wide, to accommodate a clean, good-sized udder; the flanks medium; the hocks or gambrel joints crooked; the hind legs small; the udder capacious, square, set well forward, and covered with soft, silky hair; the teats fine, standing well apart and nicely tapering; the milk veins prominent. On the whole she is a homely, blood-like, gentle, useful little housekeeping body, with a most kindly temper, loving to be petted, and, like the pony with the children, readily becomes a great favorite with those who have her about them, either in pasture, paddock, stable or the lawn. The colors are usually light red or fawn, occasionally smoky grey, and sometimes black, mixed or splashed more or less with white."

VII. Milk Mirrors.

To M. Francois Guenon, a farmer of Sibourne, France, is due the credit of having perfected a system for determining the value of a cow for milk, by the escutcheon or milk sign, (mirror as it is sometimes called) extending from the root of the tail, in the best animals, down over the udder behind and between the thighs. The writer studied it and bred by it when engaged in active farming, and, while not willing to accord full credit to the judgment of the French committee of agriculture at Bordeaux, in 1828, he believes them conscientious in their report. They used this strong language: "This system we do not fear to say is infallible." My own observation leads me to regard it as being so essentially correct, that a careful study of the "signs" will enable any person to judge pretty correctly as to the quantity and quality of the milk given and also as to the time of giving milk, after the cow is again in calf. In breeding, examine also the corresponding escutcheon in the bull, for we have always found that the bull showing the marks eminently will be pretty sure to get calves that will grow up to be good milkers.

VIII. Guenon's Theory of Milk Mirrors.

In the Guenon system there are twenty-seven diagrams representing the various grades of milking qualities, including what is called a bastard escutcheon to each grade. These vary from the fullest development in the growth of upward hair, and in the "scurf marks," down to the least possible exhibit—the "bastard escutcheons" showing, by peculiar signs, that the cow will not only give poor milk, but will fail early after again coming to be with calf. The hair indicating a good milker turns upward, is short and fine, and contains peculiar oval marks or scurf spots. The skin over this whole surface is easily raised, and is especially soft and fine in good milkers.

IX. Their Practical Utility.

To illustrate the value of the signs of a good milker, we give the results obtained by two close and intelligent observers, one a French authority, Prof. Magne, V. S., of the Veterinary School at Alfort, the other Mr. Charles Sharpless of Pennsylvania. In relation to the indications Prof. Magne, differing somewhat from Mr. Guenon, lays down the following rules:

"The direction of the hair is subordinate to that of the arteries; when a large plate of hair is directed from below, upwards on the posterior face of the udder, and on the twist, it proves that the arteries that supply the milky system are large, since they pass backwards beyond it, convey much blood, and consequently give activity to its functions. Upper tufts, placed on the sides of the vulva, prove that the arteries of the generative organs are strongly developed, reach even to the skin, and give great activity to those organs. The consequence is, that after a cow is again with calf, it draws off the blood which was flowing to the milky glands, lessens, and even stops the secretions of milk.

"In the bull, the arteries, corresponding to the mammary arteries of the cow, being intended only for coverings of the testicles, are very slightly developed; and there, accordingly, the escutcheons are of small extent.

X. The Escutcheon Marks.

"This explanation, which accords very well with all that has been observed, renders it easy to comprehend the value of the escutcheon. The more the lower ones are developed, the greater the quantity of milk; but shape is of consequence.

"But the quantity of milk, and its quality, do not depend solely on the form and size of the escutcheon; they depend on the food, the particular management, the climate, the season, the temperament, the size and energy of the principal internal organs, the capacity of the chest, the influence of the generative system, etc. All these circumstances cause the quantity of milk to vary, without making any change on the extent of the escutcheon; consequently, it is impossible that the same relation can always exist between the escutcheons and the quantities of milk. We often see cows equally well shaped, having exactly the same escutcheon, and placed under the same hygienic condition, yet not giving equal quantities, or equal qualities of milk. It could not be otherwise. Assuming that a given tuft has the same value at birth, it cannot be the same in adult age; since, during life, an infinite number of circumstances occur to diversify the activity of the milky glands, without changing the figure or size of the tuft.

"But the escutcheon has the advantage of furnishing a mark which can be easily discerned and estimated, even by persons of no great experience in the selection of cows—a mark perceptible on very young animals, and on bulls as well as heifers—a mark which, when disencumbered of the complicated system in which it has been wrapped up, will be in common use and facilitate the increase of good cows, by not allowing any but those of good promise to be reared."

XI. Good Milkers in all Breeds.

Professor Magne also gives the following directions for choosing a good cow, of any breed:

"We find good milkers in all breeds, but they are rare in some and very common in others. It could not be otherwise. Milk properties, depending on the conditions which determine the formation of breeds, are due partly to the climate, the soil, the air, and the plants of the countries where the breeds have originated; and must therefore vary with the conditions peculiar to each locality. Milkers, and more especially animals intended for breeding, must be selected among breeds celebrated for abundance of milk. For as milking qualities are in a great measure dependent on structure and temperament, which are more or less hereditary, descent exercises a great influence.

XII. Value of Heredity.

"In each breed, therefore, we should choose individuals belonging to the best stocks, and the offspring of parents remarkable for their milking qualities: for it is certain that good milch cows produce others which resemble them. A cow of a bad milking family, or even breed, may occasionally be an excellent milker, and more than this is not wanted when it is not meant to breed from her. The same cannot be said when breeding is intended, because there would be little chance of her transmitting the accidental or exceptional qualities possessed by her; whereas the qualities forming the fixed and constant characters of the stock would almost to a certainty be transmitted to descendants.

"These remarks, with regard to breed and parentage, apply to the selection of the bull, which, as experience demonstrates, acts like the cow in transmitting the milking qualities which distinguish the breed and stock.

XIII. Influence of Good Digestion and Assimilation.

"The digestive organs have a great influence on the exercise of all the functions, and particularly on the secretion of the milk-glands. Where the digestive organs are defective, good milch cows are rarely met with.

Good digestive organs are known by a belly of moderate size, with yielding sides, free from tightness, (in aged animals the belly is often large, though the organs which it contains are in good condition); a large mouth, thick and strong lips, a good appetite, easy and quick digestion, glossy hair, supple skin, yet firm, and somewhat oily to the touch. Animals possessing these characteristics may be expected to feed and drink heavily, and, if they are properly fed, make much blood and yield large quantities of milk. The respiratory organs complete the system of nutrition. The lungs bring the air breathed into contact with the blood, and render the system of nourishment complete. Hence, a good form, quick digestion and a healthy condition of the lungs are necessary to the production of a large flow of milk.

XIV. The Milk Veins.

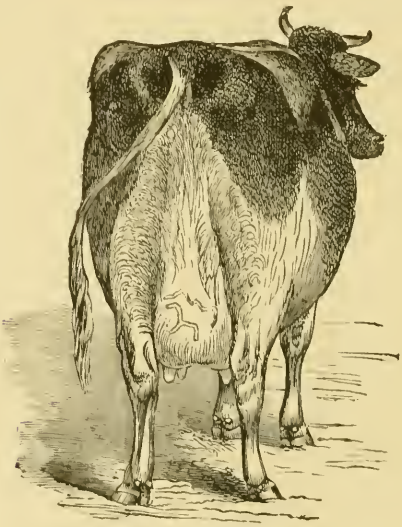
"If the veins which surround the udder are large, winding, and varicose (dilated at intervals), they show that the glands receive much blood, and, consequently, that their functions are active, and that the milk is abundant. The veins on the lateral parts of the belly are most easily observed, and all authors decide them to be among the best tests for ascertaining the activity of the glands. These veins issue from the udder, in front, and at the outer angle, where they form, in very good cows, a considerable varicose swelling. They proceed toward the front part of the body, forming angles, more or less distinct, often divide towards their anterior extremity, and sink into the body by several openings. We can make the size of the milk veins prominent by compressing them in their passage, by pressing them at the place where they penetrate into the body. If we press the thumb strongly into the opening through which the vein passes, the width of the opening represents the diameter of the vein, and the thickness of the thumb which stops it represents the volume of blood whose place it occupies. Sometimes the veins are divided. It is then necessary to examine all the openings by which they pass, in order to form a correct estimate.

XV. The Udder and Twist Veins.

"The veins of the udder and twist are able to furnish valuable indications. They should, in both cases, be highly developed, large and varicose; that is, appear swollen and knotty. The veins of the udder have no definite direction. They present themselves irregularly, with zigzag lines, knotted and more or less oblique. They are never of very large size, except in cows that give large quantities of milk.

"The veins of the twist directed from above downward, forming a winding line, interspersed with knots, resemble those of the udder in not being visible either in heifers or in cows of only fair milking quality. We

cannot ascertain their presence in any but very good cows. Of all the marks of abundant milk secretion, the best, and in fact the only infallible marks, are furnished by the veins of the twist and of the udder. To estimate them correctly it is necessary to take into account the state of the cow in respect to flesh, the thickness of skin, food, ability to stand fatigue, heat; all the circumstances, in fact, which cause variations in the general state of the circulation, and in the dilation of the veins. It is necessary, moreover, to recollect that in both sexes all the veins are larger in the old than in the young; that the veins which encircle the udder are those which, if the cows are in milk, vary most according to the age of



GREAT MILK MIRROR ON HOLSTEIN COW.

the animal. Small when the animal is young, they continue to increase in size until after the cow has had several calves, when they come to their full development.

"This proportion between the size of the veins and the milk secreted, is observed in all females without exception. The size of the veins and their varicose state being due to the blood attracted by the increased activity of the milk-glands, is not only the sign, but also the measure, of this activity—this connection. In fact, this connection is so close that, if the glands do not give an equal quantity of milk, the larger veins are on the side of the udder which gives the largest quantity.

"The length of time during which milk is given corresponds with the activity of the organs which supply it. Cows which give most milk a day, also give it the longest; and hence, if no special mark is perceived, we can judge much of the duration of milk by the marks which determine its quantity. It may therefore be accepted that as a rule an abundant milker may be expected to give a long continued flow of milk."

In illustration of what Prof. Magne says of milk mirrors in all breeds, we give an illustration of a wonderful milk mirror on a Holstein cow, corresponding to the best escutcheon of Mr. Guenon, which he names the Flanders, and which as is well known is one of the Dutch breeds.

XVI. Mr. Sharpless' Opinion.

Mr. Charles L. Sharpless of Pennsylvania, a careful breeder of Jersey cattle, and a close observer in relation to milk mirrors, holds the following:

There is no point in judging a cow so little understood as the escutcheon. The conclusion of almost every one is, that her escutcheon is good, if there be a broad band of up-running hair from the udder to the vulva, and around it. These cows with the broad vertical escutcheon are nearly always parallel cows; that is, with bodies long but not large, and with the under line parallel with the back. Their thighs are thin, and the thigh escutcheon shows on the inside of the thigh rather than on its rear.

Next comes the wedge-shaped cow, with the body shorter but very large, deep in the flank, and very capacious. This form does not usually exhibit the vertical escutcheon running up to the vulva, but with a broader thigh may exhibit a thigh escutcheon, which is preferable to the other; see Fig. 2.—Milk Mirrors of Jersey Cows, on the next page.

In both vertical and thigh mirrors, where the hair runs down, intruding on the udder (as low as above the dotted lines) as in Figs. 3 and 4, it damages the escutcheon. If you find a cow with the hair all running down, and between the thighs—that is, with no up-running hair—stamp her as a cipher for yielding milk.

There are times when the udder of a cow with an escutcheon like Fig. 4 will be enlarged by non-milking, for the purpose of deception. It is always safer to judge by the escutcheon rather than by the large size of the udder.

The escutcheons of the best cows — those yielding the most and continuing the longest — will be found to be those which conform to Fig. 2.

The vertical escutcheon of Fig. 1 would not injure it; but if that ornamental feature has to be at the expense of the high escutcheon, Fig. 2 is best as it is.

Whenever an escutcheon is accompanied by a curl on each hind-quarter of the udder, it indicates a yield of the highest order.

So far, we have noticed only the rear escutcheon, or that which represents the two hind quarters of the udder. The two front quarters are just as important, and should be capacious and run well forward under the body. If the udder in front be concave, or cut up, indicating small capacity, it represents reduced yield.

This front or level escutcheon is distinctly marked in the young heifer or bull, and can be seen by laying the animal on its back. The udder

FIG. 1. FIG. 2.

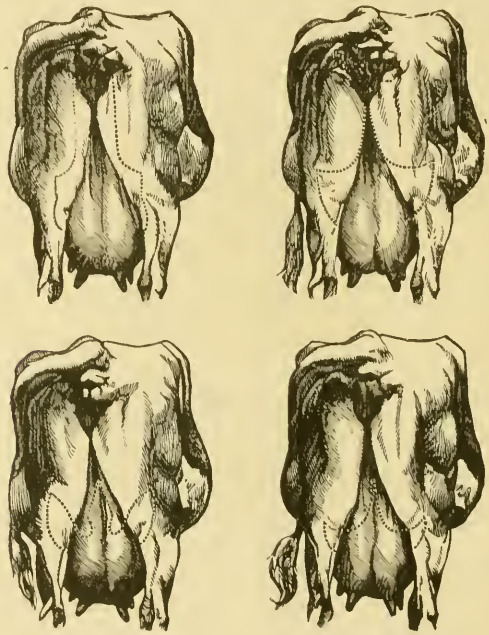


FIG. 3. FIG. 4.

MILK MIRRORS OF JERSEY COWS.

hair under the body all runs backward, commencing at the forward line of the escutcheon. This dividing line is very perceptible, from the fact that the hair in front of it all runs forward towards the head of the animal, while the escutcheon, or udder hair, all runs backward, over the forward quarters of the udder, around and beyond the teats, and ceases at the markings of the rear escutcheon on and between the thighs.

The breadth and extent forward of this front escutcheon indicates the capacity in the mature animal, of the front quarters of her udder. In some cases this front escutcheon will be found of twice the extent that it is in others, and is evidence of that much more yield.

This examination enables one to see the size of the teats and their distance apart, and to test the looseness and softness of the udder skin. It is marked precisely the same in bulls, and can be easily examined at any age between one and ten months.

Many think that the escutcheon of the bull is of little moment, so that he has a good look. So far is this from being the case, that a bull with a mirror like Fig. 4, or worse, will stamp his escutcheon on, and to that extent damage, his daughters out of cows with escutcheons as choice as

JERSEY HEIFER.

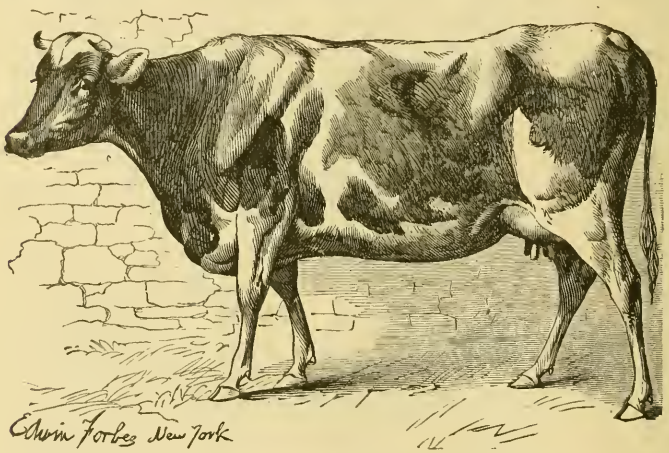
Fig. 2. In this way the daughters of some of the best cows come very ordinary, while, if you use a bull marked like Fig. 2, he will make a poor escutcheon better, and will improve the best. His injury or benefit will be doubled according to the escutcheon markings under the body in front of his scrotum. Hence the importance of the dam of a bull being unexceptionable in her udder and escutcheon. Her qualities inherited by her son will be transmitted to his daughter.

While careful as to escutcheons, we must not neglect the other essential features of a good cow—the back, skin, hide, the rich colored skin, and the fine bone. Let the hair be soft and thickly set, and let the skin be mellow. This latter quality is easily determined by grasping between the thumb and forefinger the skin at the rear of the ribs, or the double thickness at the base of the flank that joins the stifle-joint to the body, or that

on the inside of the rump-bone at the setting on of the tail. Let the teats be well apart; let them yield a free and full stream and be large enough without the necessity, in milking, of pulling them between the thumbs and forefingers. And let us ever keep in mind that the large yielders must be well fed.

XVII. Symmetry Essential Whatever the Breed.

In estimating the value of a breed its characteristics must be studied. Each breed has its peculiar style and conformation, and thus, symmetry, which is found in all good stock, will vary in different breeds. The Jersey has a standard of symmetry peculiarly its own, which we illustrate by



JERSEY COW.

two engravings, one of a heifer, the other of a cow, which fairly exhibit the characteristics of the breed.

The symmetry of the Jerseys is angular. They are essentially fine in the head, with thin necks and rather light fore-quarters, but with large, barrel-shaped bodies, inclined to be flat, rather than round, and swelling behind into deep but rather thin thighs. This same conformation will be found measurably in all milking breeds, but modified, each having its own peculiar symmetry.

The Jerseys are essentially milking cows and nothing else, although they fatten rather kindly when past milking: but the beef is neither superior in quality nor large in quantity.

XVIII. The Jersey not a Dairy Cow.

In the strict sense of the word the Jersey is not a dairy cow. She is essentially the cow for rich milk, but not a cheese-maker; she lacks size to give quantity in this respect. The butter globules are not only larger than in other breeds, but the covering—the film enveloping the fat-globules, is weaker. Hence the globules give up the butter easily in churning. The cream is also high-colored from the excess of yellow pigment it contains.

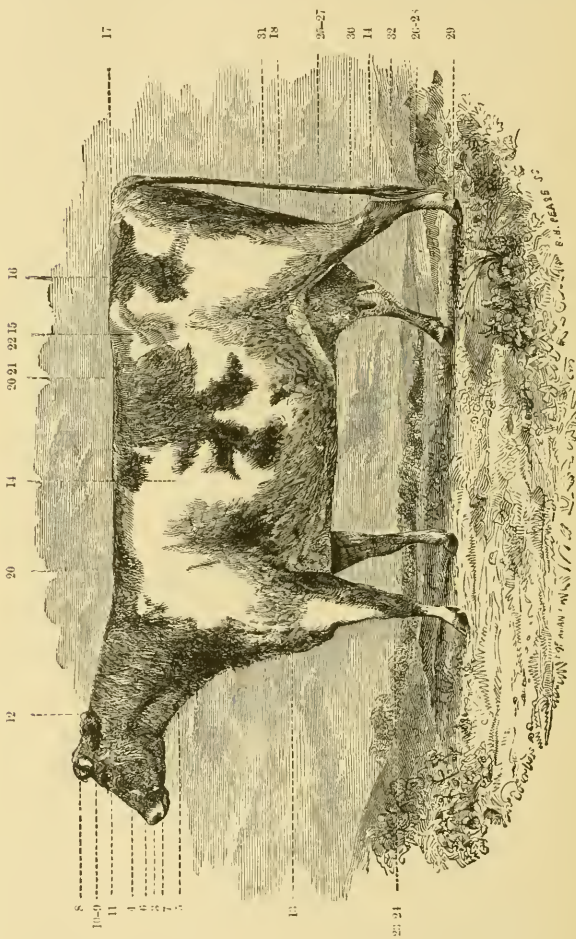
For the family requiring milk rich in cream and butter, the Jerseys will always be desirable, and, since they have taken kindly to our climate in nearly every section of the union, and even in Canada, they have from their docile and tractable dispositions become universal favorites where kindly treated. The bulls are not always good-tempered, and hence require not only a firm hand, but careful management; and the cows, if abused, will by no means fail to resent the brutal treatment.

XIX. Scale of Points for Jersey Cows and Heifers.

The scale of points adopted by the Royal Agricultural and Horticultural Society of Jersey, and by which all animals of the breed are now judged is as follows. It will be the more readily understood if studied in connection with the accompanying illustration of a model Jersey cow figured for perfection. Here is the scale:

Article.		Points.
1.	Head,—small, fine and tapering	1
2.	Cheek,—small	1
3.	Throat,—clean	1
4.	Muzzle,—fine, and encircled by a bright color	1
5.	Nostrils,—high and open	1
6.	Horns,—smooth, crumpled, not too thick at the base, and tapering	1
7.	Ears,—small and thin	1
8.	Ears,—of a deep orange color within	1
9.	Eye,—full and placid	1
10.	Neck,—straight, fine, and placed lightly on the shoulders	1
11.	Chest,—broad and deep	1
12.	Barrel,—hooped, broad and deep	1
13.	Well ribbed home, having but little space between the last rib and the hip.	1
14.	Back,—straight from the withers to the top of the hip	1
15.	Back,—straight from the top of the hip to the setting on of the tail, and the tail at right angles with the back	1
16.	Tail,—fine	1
17.	Tail,—Hanging down to the hocks	1
18.	Hide,—thin and movable, but not too loose	1
19.	Hide,—covered with fine, soft hair	1
20.	Hide,—of good color	1
21.	Fore-legs,—short, straight and fine	1
22.	Fore-arm,—swelling, and full above the knee	1
23.	Hind-quarters,—from the hock to the point of the rump well filled up	1

Article.		Points.
24.	Hind-legs,—short and straight (below the hocks) and bones rather fine.	1
25.	Hind-legs,—squarely placed, not too close together when viewed from behind	1



MODEL JERSEY COW. PERFECTION 36 POINTS, ILLUSTRATED.

26.	Hind-legs,—not to cross in walking	1
27.	Hoofs,—small	1
28.	Udder,—full in form, *i. e.*, well in line with the belly	1

Article.		Points.
29.	Udder,—well up behind	1
30.	Teats,—large, squarely placed; behind wide apart	1
31.	Milk-veins,—very prominent	1
32.	Growth	1
33.	General appearance	1
34.	Condition	1
	Perfection	34

XX. Rules in Awarding Prizes.

No prize shall be awarded to cows having less than twenty-nine points.

No prize shall be awarded to heifers having less than twenty-six points.

Cows having obtained twenty-seven points, and heifers twenty-four points, shall be allowed to be branded, but cannot take a prize.

These points, namely, Nos. 28, 29, and 31, shall be deducted from the number required for perfection in heifers, as their udder and milk-veins cannot be fully developed; a heifer will, therefore, be considered perfect at thirty-one points.

To which we add:

One point must be added for pedigree on male side.

One point must be added for pedigree on female side.

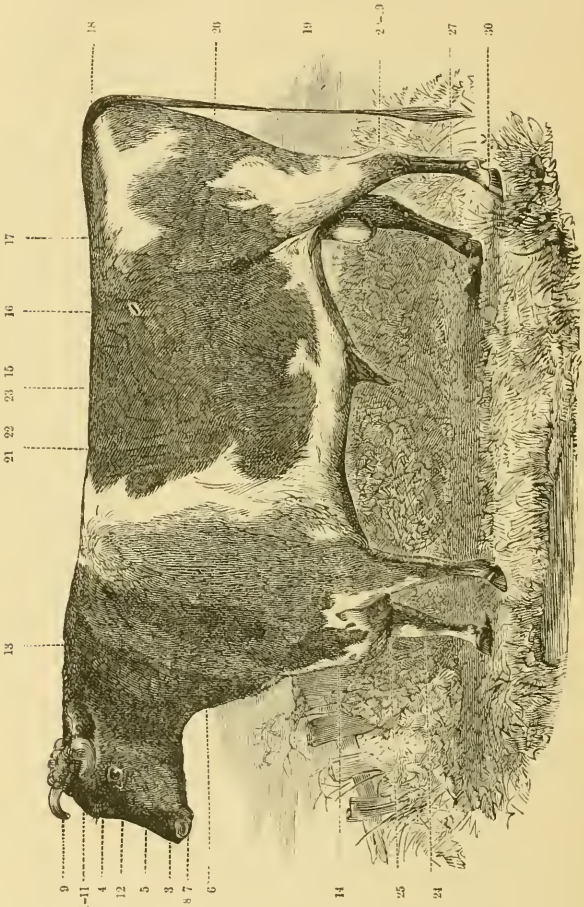
Again, the size of the escutcheon, or milk-mirrors, is a point of especial attention, for the escutcheon is now coming to be accepted as an indication of the milking qualities of a cow, and, whatever the breed may be, strongly relied upon. And those who discard it, that is, refuse a cow with a strong escutcheon, will surely go estray.

XXI. Scale of Points for Jersey Bulls.

In judging bulls a somewhat different standard is adopted, and the same rule will apply in all cattle with proper variations, according to breed. The illustration of a Jersey bull, figured for perfection, will assist in understanding the scale of points. Here is the scale:

Article.		Points.
1.	Pedigree on male side	1
2.	Pedigree on female side	1
3.	Head,—fine and tapering	1
4.	Forehead,—broad	1
5.	Cheek,—small	1
6.	Throat,—clean	1
7.	Muzzle,—fine and encircled with light color	1
8.	Nostrils,—high and open	1
9.	Horns,—smooth, crumpled, not thick at the base and tapering, tipped with black	1
10.	Ears,—small and thin	1
11.	Ears,—of a deep orange color within	1
12.	Eyes,—full and lively	1

ARTICLE.		POINTS.
13.	NECK.—arched, powerful, but not coarse or heavy	1
14.	CHEST.—broad and deep	1
15.	BARREL.—hooped, broad and deep	1



JERSEY BULL, PERFECTION 33 POINTS, ILLUSTRATED.

16.	Well ribbed home, having but little space between the last rib and the hip	1
17.	BACK.—straight from the withers to the top of the hip	1

		Points.
18.	BACK,—straight from the top of the hips to the setting on of the tail, and the tail at right angles with the back	1
19.	TAIL.—fine	1
20.	TAIL.—hanging down to the hocks	1
21.	HIDE,—thin and movable	1
22.	HIDE,—covered with fine and soft hair	1
23.	HIDE,—of a good color	1
24.	FORE-LEGS.—short, straight and fine	1
25.	FORE-ARM.—large and powerful, swelling and full above the knee, and fine below it	1
26.	HIND-QUARTERS,—from the hock to the point of the rump long and well filled up	1
27.	HIND-LEGS,—short and straight, (below the hocks) and the bones rather fine	1
28.	HIND-LEGS,—squarely placed, not too close together when viewed from behind	1
29.	HIND-LEGS,—not to cross in walking	1
30.	HOOFS,—small	1
31.	Growth	1
32.	General appearance	1
33.	Condition	1
	Perfection	33

XXII. Estimating the Value of Points.

The proper estimation of the value of the several parts of an animal has been publicly given by high authority in such matters, the Jersey Herd Book. The gist of which is as follows:

The highest excellence of any milking cow lies in the udder. This must not only be full in form, that is, in line with the belly, but it must not be cut off square in front, like that of a goat. It should be rounded, full, presenting great breadth behind, and carried well up between the thigh. The milk veins should be full and carried well forward toward the fore legs. If knotted and with curves, so much the better.

The tail is another essential point. Whatever its size at the root, it *must* be large and tapering, and have a good switch of hair.

The chest should be broad and deep; this shows good respiration, essential to feeding and health. But in the dairy cow, especially when viewed from before, there will be no appearance of massiveness. On the contrary, she will give an appearance of delicate fineness, and will look large behind, swelling gradually from behind the shoulders. She may not be closely ribbed, in fact should not be close, only comparatively so. The best milkers, every where, will be found to be rather loosely put together between the last rib and the hips, and good milkers must be roomy in the flank.

The hind quarters must be long from the point of the rump to the hock, and well filled up; yet this does not mean rounded and massive in

flesh: on the contrary, the best milkers will be rather lean and perhaps high boned. Nevertheless, the same animal, when out of milk and fat, may fill up; and perhaps, present a fully rounded contour, while yet possessing all the delicacy of points characteristic of the high-bred dairy cow.

A cow may have large and heavy ears; her back may not be fully straight from the withers to the top of the hips; her rump may be sloping; her tail may not reach the hocks;—all these are defects, the latter a serious one, yet if the milking organs are super-excellent it will outweigh all these.

A phenomenon may show absolute perfection in all the points: we have never yet seen such an one. In judging, the essentials are to carefully consider each point of excellence with reference to its bearing upon the animal as a dairy cow.

XXIII. Color and Size.

Do not be too particular about color; solid colors, and black points look well in the show ring. The animal that will turn out well at the pail, that is docile and gentle, be she what color she may, so long as she adheres to the distinguishing color-marks of the race, is the one for the milking yard. In relation to size, the Jerseys are a small race of cattle. In no breed are overgrown animals the most valuable. With the Jersey it is especially to be avoided. So, an undersized animal is not to be countenanced. Fair size, however, is desirable. He who seeks to increase the size of the Jersey unduly, will certainly go astray. They have been carefully bred, for many generations, with especial reference to milk. The Jersey is the product of islands peculiar in soil, climate, and people. Transplanted to the flush pastures of the United States, with good shelter in winter, they will necessarily increase in size. If you fancy "solid colors," and can get plenty of rich milk, with solid colors, well and good. If not, breed to whatever color, characteristic of the breed, which will give you this desirable result.

We have chosen thus explicitly to state, from competent authorities, the Jersey standard of perfection—first, for the reason that any breed should be judged by the standard of its breeders, and secondly, because these statements can only be found originally in the herd books, and like authoritative publications which are not accessible to the majority of readers.

XXIV. From a Practical Stand-point.

From the practical stand-point of a person not a breeder of high-caste animals, the writer has found that slight imperfections, in the make up of farm animals, do not militate against them unless they are intended as

breeders of pure stock of the highest type. In fact, few animals of a breed attain perfection closely, and almost none absolutely, according to the standard. As a milking cow, a Jersey or cow of other milking breed might be of the best possible standard and yet fail essentially in some other important points. Such a cow would be just as valuable for the one purpose of milk as the best.

So in any other particular the person, whether he be a breeder or simply a fancier, must study the characteristics and the points of an animal, and then make up his mind whether in the one case it is worth the money asked for it, or in the other case whether it would be more profitable to sell rather than to keep.

CHAPTER VII.

MIDDLE-HORNED CATTLE—THE HEREFORDS.

I. THE VALUABLE BREEDS OF MIDDLE-HORNS.——II. THE HEREFORD COLOR.——III. THE HEREFORDS FIFTY YEARS AGO.——IV. YOUATT'S TESTIMONY.——V. THE HEREFORDS IN AMERICA.——VI. THE IMPORTATION OF 1840.——VII. HEREFORD GRADES FORTY YEARS AGO.——VIII. THE OHIO IMPORTATION.——IX. HEREFORDS IN CANADA.——X. EARLY IMPORTED HEREFORDS NOT FAIRLY TRIED. XI. THE HEREFORDS WEST.——XII. THE HEREFORD AS A WORK OX.——XIII. THE HEREFORD COW.——XIV. POINTS OF THE HEREFORD.——XV. THE HEREFORD OF TO-DAY IN ENGLAND.——XVI. HIGH AND AUTHORITATIVE PRAISE.——XVII. DISTRIBUTION IN THE SOUTHWEST AND FAR WEST.

I. The Valuable Breeds of Middle-Horns.

The only valuable breeds of the Middle-Horns, in the United States, are the Herefords and the Devons, which will be treated of in this chapter and the next. They are essentially beef and working breeds. Their milking qualities were never more than moderately developed, and these qualities by continued breeding for beef, (for which they are unexceptionable,) have been so bred out, that but little now remains in them valuable for milk.

The natural history of these breeds was noticed in Chapter I, and it will not be necessary to refer to it, further than to say of the Herefords that, originally named from the country of Hereford, England, where, and in adjacent counties, similar cattle have been bred for hundreds of years, few, if any, of the popular beef breeds have shown more wonderful improvement within the last fifty years.

II. The Hereford Color.

Originally red or brown without white, the Herefords bred to brownish or yellowish red, and even brindled. Within about the last 100 years their faces became white or mottled-white, until finally the distinctive white of the face was made to extend along the top of the neck, and along the throat, dewlap, brisket, belly, and flanks, and they are now fashionably bred with the addition of white legs, and the switch of the tail white, the rest of the animal being of a uniform red color.

III. The Herefords fifty years ago.

Mr. Marshall writing of them as they existed in England fifty years ago, and as then improved, describes them thus: "The countenance pleasant, cheerful, open: the forehead broad; eye full and lively;

horns bright, taper, and spreading; head small; chap lean; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the chine; quarters long, and wide at the neck; rump even with the level of the back, and sharp above the quarters; tail slender and neatly haired; barrel round and roomy; the carcass throughout deep and well spread; ribs broad, standing flat and close on the outer surface, forming a smooth, even barrel; the hind parts large and full of strength; neck bones snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hock small; feet of middle size; flank large; flesh every where mellow, soft, and yielding pleasantly to the touch, especially on the chine, the shoulder and the ribs; hide mellow, supple, of a middle thickness, and loose on the neck and huckle; coat neatly haired, bright, and silky; color, a middle red; this, with a bald face, is characteristic of the true Hereford breed."

IV. Youatt's Testimony.

In Youatt's day they were the peers of the Short-Horns, and to-day they compare favorably with that famous breed, and take an equal share of prizes with them in our best exhibitions and fairs. They fatten, said Mr. Youatt, to a much greater weight than the Devons, and run from fifty to seventy score; a tolerable cow will average from thirty-five to fifty score (1000 pounds): a cow belonging to the Duke of Bedford weighed more than seventy; an ox of Mr. Westcar's exceeded one hundred and ten score (2,200 pounds). The Hereford ox fattens speedily at an early age. They are not now much used for husbandry, although their form adapts them for the heavier work, and they have all the honesty and docility of the Devon ox, and greater strength, if not his activity. The Hereford cows are worse milkers than those of Devon, but then they will grow fat where a Devon would starve. The beef is sometimes objected to from the largeness of the bone and the coarseness of some of the inferior pieces, but the best sorts are generally excellent.

V. The Herefords in America.

Since there has been so much controversy—sometimes acrimonious—between some Hereford and Short-Horn breeders in the United States, and especially in the West, where the Herefords have of late grown into the highest favor, we again quote, from Mr. L. F. Allen, the veteran breeder of Short-Horns, and editor of the American Short-Horn Herd Book. Mr. Allen writes of the Herefords as follows:

"At what date they were first imported into this country, we have no accurate account; but that some Herefords came out among the early importations, is evident from the occasional marks of the breed among our native cattle where late importations have not been known. In the year 1816 or '17 the great Kentucky statesman, Henry Clay, imported two pairs of them into his State, and put them on his farm at Ashland. They were bred for a time with each other, and the bulls were crossed with other cows; but it is certain that they left no permanent impress on the herds of that vicinity, as Mr. Clay himself became a breeder of Short-Horns soon afterwards, and eventually discarded the blood from his herds, if he had for any length of time retained it. No trace of them is now seen in Kentucky.

VI. The Importation of 1840.

"The largest importation of Herefords into the United States, was made about the year 1840, upwards of twenty in number, by an Englishman into the city of New York, and taken into Jefferson county, of that State. A year or two afterwards the bulk of the herd were removed to the farm Mr. Erastus Corning, near Albany, N. Y., and some of them went into Vermont, where they were for some years bred, sold and scattered. While the stock were at his farm, Mr. Corning, with his accustomed liberality and enterprise, sent out again to England to purchase more animals, which safely arrived, and were added to the herd. They were then successfully bred for several years, many sales made into different and distant parts of the United States, and they acquired considerable popularity. The herd was subsequently divided, Mr. Corning retaining his share, and his partner taking his, some twenty or more in number, to a farm three or four miles from Buffalo, on the banks of the Niagara. Here they were bred, and several sales made, to go to different parts of the country, during the four or five years they remained; but the herd gradually waned, mainly from want of proper care and system in their keeping.

"Mr. Corning retained his herd at his farm, where he has successfully bred, and made sales from them since, and in the hands of his son, Mr. E. Corning, Jr., who is more an amateur than a professed cattle breeder, added to by occasional importations from England, they remain fine specimens of their race.

VII. Hereford Grades Forty Years Ago.

"Mr. George Clark, at Springfield, Otsego county, N. Y., obtained several Herefords from this herd, and, we believe, made an importation or two from England. He bred them successfully, distributed his bulls

on to several of his farms, and bred many excellent grade Herefords from the common cows. His bullocks have, in past years, been highly approved in the New York cattle markets.

VIII. The Ohio Importation.

"About the year 1852–3, Messrs. Thomas Aston, and John Humphries, two English farmers in Elyria, Ohio, near Lake Erie, imported several fine Herefords. They bred them well and successfully, as seen in the specimens we have several times met, but with what success in their sales we have no intimate knowledge.

IX. Herefords in Canada.

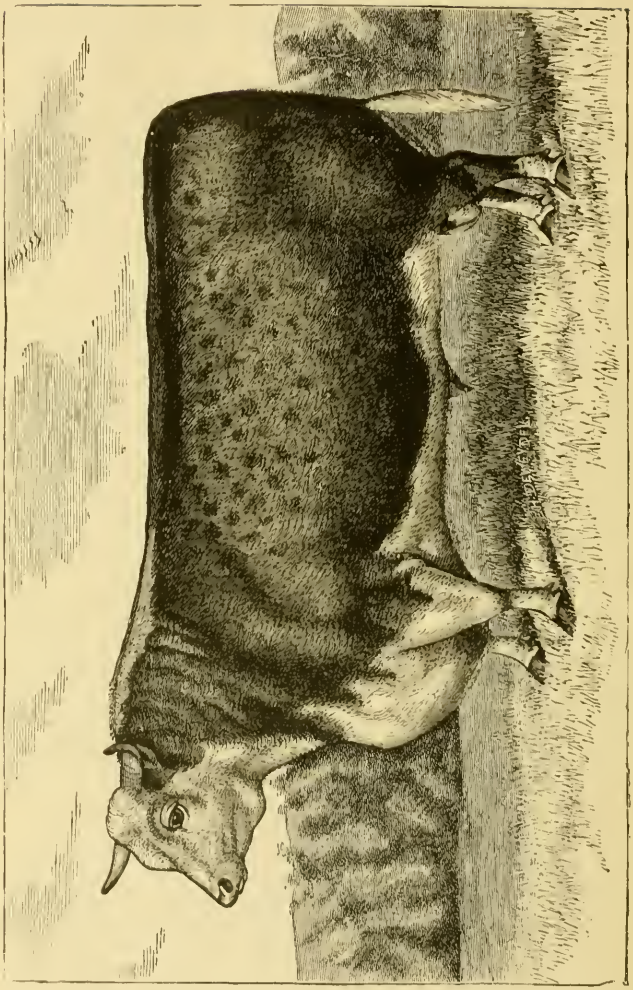
"In the years 1860 and '61, Mr. Frederick Wm. Stone, of Guelph, Canada West, made two importations of superior Herefords from the herds of Lord Bateman, in Herefordshire, and the late Lord Berwick, in the adjoining county of Shropshire, England, numbering, together, two bulls and eleven cows and heifers. These were remarkable for their high breeding, and generally good points. From them down to January, 1867, there were bred about sixty, and about half the number have been sold at satisfactory prices, and distributed, mostly into the United States. Some of the cows have proved excellent milkers, and all, together with the crosses of the bulls with common cows, have proved profitable grazing animals.

X. Early Imported Herefords Not Fairly Tried.

"On the whole, the Herefords have not had a fair trial in the United States, in the hands of veteran cattle breeders who had the means and opportunity to properly test them by a thorough and persistent course of breeding. Had the fine herd which was for several years on Mr. Corning's farm, been taken to good grazing lands in New York, or some of the Western States, and properly cared for, their history, we fancy, would have been far different from that which is here recorded."

XI. The Herefords West.

Since Mr. Allen wrote, the Herefords have been tried in many Western States, and in no respect either in kindly fattening, early maturity or heavy weights have they failed fairly to compete with the best Short-Horns in the principal prize fairs of the West, often carrying off the highest honors. Besides the breeders already mentioned, none have done more for the Herefords in the United States than Mr. Miller and Mr. Culbertson, of Illinois, each of whose large herds is composed of the very highest-caste animals to be found anywhere.



IMPROVED HEREFORD BULL.

XII. The Hereford as a Work-Ox.

As work oxen the Herefords are inferior to the Devons, when activity is wanted, but for heavy draft they have no superior, being muscular, steady and patient at the yoke. Their capacity for standing fatigue, and their constitutional hardihood and resistance to cold are indeed remarkable, and of late years they have become great favorites with the ranchmen in the far Western States and Territories.

XIII. The Hereford Cow.

Two years ago, in collecting information about this valuable beef breed, we wrote, and now repeat:

The Hereford cow compared with the ox is small and delicate, and not always handsomely made, to the superficial observer.

Here again this breed would seem to show its relationship to the Devon. She carries but little flesh in breeding condition, and when breeding, should not be fed sufficiently to accumulate much fat, for, in order that the young be superior, the dam should have plenty of room inside.

With the Herefords, experience has shown that the dam may not be too large or coarse but she should be roomy. Then the breeder will get, even from apparently inferior cows, large, handsome steers, that will fatten early, and kindly, and to great weights.

When the cow is done breeding, and ready for fatting, it will please the owner to see how she will spread out, and accumulate flesh and fat, and this to a greater degree than if not allowed to breed.

The Herefords are a hardy, gentle race, maturing early, and are long-lived. The flesh is superior, handsomely marbled, heavy in the prime parts, and they fatten to weights fully as heavy as any known breed.

Their massive strength, honesty and gentleness make them the best working oxen known, and the potency of the bulls, when crossed upon red or nearly red cows of the country, renders the steers easily matched in color, as they will be easily matched in general characteristics of the progeny.

XIV. Points of the Hereford.

In judging the Herefords as beef animals the same scale of points may be adopted as for Short-Horns, except that the Herefords are, if anything, more placid, closer to the ground, heavier in appearance, and, as a rule, thicker-meated than the present fashionable Short-Horns.

XV. The Hereford of To-day in England.

It has been claimed, and we think with truth, that in some show rings in the West the Herefords were discriminated against. Be this as it may,

in England there is no such feeling against them, and, besides, the English system of judging precludes, to as great an extent as possible, any shadow of favoritism.

Speaking of one of the great show rings there in 1878, the Bath and West of England, the *Mark Lane Express* says of the Hereford exhibit:

"They are not so numerous as the more fashionable breed, but the quality throughout is excellent. In the aged bull class there are five animals of which the Hereford men need not be ashamed.

"The heifers in milk or in calf numbered only three, but two of them were such animals as it was worth while coming to Oxford on purpose to see. Leonora (first premium) is one of the most perfect animals that has been shown for years. It was first last year as a yearling at Liverpool, and will likely be first wherever it goes. The champion prize given by the Oxfordshire Agricultural Society was awarded to this heifer as the best female horned animal in the yard. The companion heifer, Beatrice, is also very handsome, and took second to Leonora's first at the Royal last year, as it did last week at Oxford. If Leonora had been a Grand Duchess Short-Horn a poem would have been composed in her honor, and translated into several languages by this time. But no Short-Horn that we have ever seen was cast in such a mould."

XVI. High and Authoritative Praise.

The following is high praise, and authoritative, as coming from an English agricultural paper of the highest class. The *Agricultural Journal*, of London, says:

"This breed enjoyed the remarkable distinction of producing both the champion animals at Oxford, Grateful being declared to be the best bull, and Beatrice (a two year old heifer) being declared to be the best cow or heifer in the yard. Both, as may be supposed, were very good, the heifer pre-eminently so. She is a daughter of the famous bull, Winter de Cote, and another instance of hereditary merit.

"The yearling heifers and calves indicate that this breed is, as beef makers at an early age, quite up to the highest Short-Horn standard. The Teeswater may milk better, and be more ready in adapting itself to local circumstances; but where the pasture is good, it is hard to beat the white-faces for grazing."

Again, the *Chamber of Agriculture Journal*, the organ of the Royal Agricultural Society, gives the following testimony:

"The old bull Hereford class produced an extraordinary animal in Grateful, who secured the reserve at the Hereford show in 1876. He has made wonderful development since appearing as a two-year old, as is proved by the fact that Thoughtful, who was then placed above him,

and has since taken firsts at Birmingham, Liverpool and Bath, has now been put second to him; and that not only was he selected by the judges as the best Hereford bull on the ground, but in the contest for the championship succeeded in carrying it off against such a Short-Horn competitor as Sir Arthur Ingram. Grateful, at four years old, has capital loins and chines, with great thickness and depth of frame, and is very level all over; but his grand feature is the astounding mass of flesh with which his frame is covered. His girth is eight feet ten and one-half inches.

"In the cow class, Lady Blanche, which took second prize at Bath, now came to the front position. She is marvelous at her fore flank, and displays a great mass of flesh on a well-shaped, grand frame, which, however, fell off slightly at the rump. The second prize cow, Little Beauty, was highly commended at Bath, and wonderfully retains her show-yard merit at eleven years old. The two-year old heifers, Leonora and Beatrice, were, of course, sure to win. Beatrice has recently reared a calf, which is slightly against her for showing; but Leonora is in full bloom with her beautiful head, symmetrical form, and all that loveliness which is so taking to the eye. After being selected as the best Hereford female on the ground, she carried off the champion prize against a remarkably shapely Short-Horn heifer, and one of the best Devons that has appeared for years, so that both cups were awarded to Herefords."

XVII. Distribution in the South-west and Far West.

Since neither pains nor money has been spared in bringing the best English animals to this country, there is no doubt but that the West today possesses Herefords, both bulls and cows, as good as there are in the world. Hereford bulls are being sent off and distributed in the far West, and South-west, where they are regarded with fully as much favor as the Short-Horns. Why should they not? There is plenty of territory left for the spread of both these admirable breeds of beef cattle.

CHAPTER VIII.

MIDDLE-HORNED CATTLE—THE DEVON AND THE SUSSEX.

I. ANTIQUITY OF THE DEVONS.——II. THE DEVONS COMPARATIVELY SMALL CATTLE.——III. NATURAL GRAZING GROUNDS OF THE DEVONS.——IV. WORKING QUALITIES OF THE DEVONS.——V. THEIR DECEIVING APPEARANCE.——VI. POINTS OF THE DEVON.——VII. NOTABLE CHARACTERISTICS.——VIII. THE LEGS OF THE DEVON.——IX. THE BODY AND TAIL.——X. THE DEVON COW.——XI. MR. ALLEN'S TESTIMONY.——XII. THEY ARE ACTIVE AND HANDY.——XIII. IN THE FIRST CLASS FOR BEEF.——XIV. WEIGHTS OF THE DEVONS.——XV. SUSSEX CATTLE.——XVI. THE SUSSEX COLOR.——XVII. DISTINGUISHING MARKS OF THE SUSSEX.——XVIII. THE SUSSEX COW.——XIX. GLAMORGAN CATTLE.

I. Antiquity of the Devons.

In Chapter I, the general history of this ancient and superior race of cattle is given. They are the only breed of middle-horned cattle, except the Herefords, that has attained celebrity in the United States. In England, where they have been known from the earliest times, they have been bred pure. In certain sections, and especially in North Devon, particular pains was long ago taken in raising them. There the Devon unites all the characteristics of the tribe, including medium size, dark color, eminent working qualities and great excellence of beef. The peculiarities in color and substance about the eyes, nose and ears, have caused them to be known as North Devons, in contradistinction to the lighter-colored, larger and coarser cattle of other districts, but which combine some of the better qualities of the true Devon.

II. The Devons Comparatively Small Cattle.

The chief objection to the Devons, in the West, is that they lack size to prove profitable on the flush and comparatively level pastures of the prairie region. They are, also, somewhat slow in maturing; in fact it used to be the practice in England to put the steers to work at three years old, and fatten them at five or six years old. Then, fully matured and spread, they wholly or partially paid for their keeping, and the quality of their flesh was only surpassed by that other slow-maturing, but wonderful cattle in the quality of their beef—the West Highland cattle of Scotland.

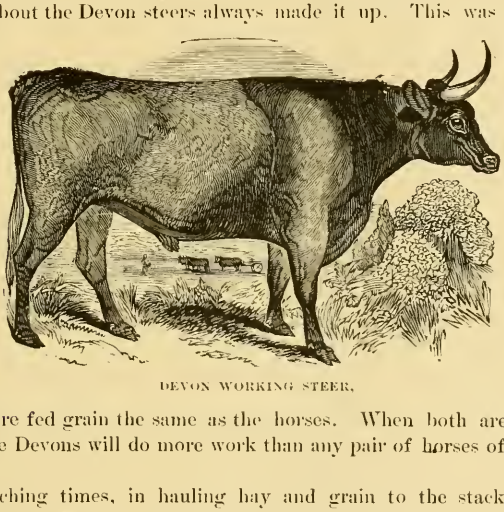
III. Natural Grazing Grounds of the Devons.

To-day in all our hill country, or where the labor of the steers can be utilized, they are the most valuable of any of the known breeds of cattle. In all the hill country, North and South, they will be found among the

best, if not the very best, of domesticated cattle, when we consider the ease with which they are kept, their powers of withstanding extreme heat and cold, and their valuable working qualities; for they are able to perform fully as much work as the horse in plowing, especially in small fields where there is much turning.

IV. Working Qualities of the Devons.

We have known them to keep fully up with horses, day after day, in heavy plowing—a yoke of Devon steers at the beam, and a pair of horses ahead. So, in stubble plowing; a single yoke of Devon steers, week in and week out, would do fully as much work on small lands as a good pair of horses; and they turn the furrows quite as steadily as the horse team. The horses would gain something in going straight ahead, but in coming about the Devon steers always made it up. This was when the



DEVON WORKING STEER.

steers were fed grain the same as the horses. When both are kept on grass, the Devons will do more work than any pair of horses of the same weight.

In catching times, in hauling hay and grain to the stack, we have driven Devon steers at a six-mile trot in going back light; and their wonderful tractability, under kind but firm training, certainly makes them most admirable teams for new or thinly-settled districts. For logging in the woods, or hauling logs to the mill, there are no better or quicker teams, and it is surprising, under good keeping, the load they will start, and the power with which they will move it along the road.

V. Their Deceiving Appearance.

The Devons are essentially muscular cattle. They are far heavier than they look. This is owing to their fine bone—nearly as hard as that of a blood horse—their round, compact form, and the full flesh they carry.

The cows are small; and the bulls are smaller than the steers. When properly developed by two years of work, the oxen are splendidly filled out, and are certainly the most beautiful of all the domesticated ox tribe. The illustration we give will show the Devon ox in good working condition. The cut of a high-caste bull, illustrating especially the full, soft, mossy coat of hair, as given in Chapter I, is a most excellent and life-like drawing.

VI. Points of the Devon.

Youatt describes the points of the Devon of his day most minutely. Except that they have now, through better feeding in America, been increased in size and early maturity, the description is as applicable to-day as when it was written. It is as follows:

"The horn of the bull ought to be neither too low nor too high, tapering at the points, not too thick at the tip.

The eye should be clear, bright, and prominent, showing much of the white, and have around it a circle of dark orange color.

The forehead should be flat, indented, and small, for, by the smallness of the forehead, the purity of the breed is very much estimated.

The cheek should be small, and the muzzle fine; the nose must be of a clear yellow.

The nostril should be high and open; the hair curled about the head.

The neck should be thick, and that sometimes almost to a fault.

Excepting in the head and neck, the form of the bull does not materially differ from that of the ox, but he is considerably smaller. There are exceptions, however, to this rule.

The head of the ox is small, very singularly so, relatively to his bulk; yet it has a striking breadth of forehead; it is clean and free from flesh about the jaws.

The eye is very prominent, and the animal has a pleasing vivacity of countenance, distinguishing it from the heavy aspect of many other breeds.

Its neck is long and thin, admirably adapting it for the collar, or the more common and ruder yoke.

It is accounted one of the characteristics of good cattle, that the line of the neck, from the horns to the withers, should scarcely deviate from that of the back.

VII. Notable Characteristics.

"In the Devon ox, however, there is a peculiar rising at the shoulder, reminding us of the blood-horse, and essentially connected with the free and quick action by which this breed has ever been distinguished.

It has little or no dewlap depending from the throat.

The horns are longer than those of the bull, smaller, and fine even to the base, and of a lighter color, and tipped with yellow.

The animal is light in the withers; the shoulders a little oblique; the breast deep, and the bosom open and wide, particularly as contrasted with the fineness of the withers.

The fore legs are wide apart, looking like pillars that have to support a great weight.

The point of the shoulder is rarely or never seen. There is no projection of bone, but there is a kind of level line running on to the neck.

Angular bony projections are never found in a beast that carries much flesh and fat.

The fineness of the withers, the slanting direction of the shoulder, and the broad and open breast, imply strength, speed, and aptitude to fatten.

A narrow-chested animal can never be useful either for working or grazing.

With all the lightness of the Devon ox, there is a point about him, disliked in the blood or riding horse, and not approved in the horse of light draught—the legs are far under the chest, or rather the breast projects far and wide before the legs. We see the advantage of this in the beast of slow draught, who rarely breaks into a trot, except when he is goaded on in catching times, and the division of whose foot prevents him from stumbling.

The lightness of the other parts of his form, however, counterbalances heaviness there.

VIII. The Legs of the Devon.

The legs are straight, at least in the best herds. If they are in-kneed or crooked in the fore legs, it argues a deficiency in blood, and comparative incapacity for work, and for grazing, too; for they will be hollow behind the withers, a point for which nothing can compensate, because it takes away so much from the place where good flesh and fat should be thickly laid on, and diminishes the capacity of the chest and the power of creating arterial and nutritious blood.

The fore-arm is particularly large and powerful. It swells out suddenly above the knee, but is soon lost in the substance of the shoulder.

Below the knee the bone is small to a very extraordinary degree, indicating a seeming want of strength; but this impression immediately ceases, for the smallness is only in front—it is only in the bone; the leg is deep, and the sinews are far removed from the bone, promising both strength and speed.

It may be objected that the leg is a little too long. It would be so in an animal destined only to graze; but this is a working animal, and some length of leg is necessary to get him actively over the ground.

IX. The Body and Tail.

"There is some trifling fall behind the withers, but no hollowness, and the line of the back is straight from thence to the setting on of the tail. If there is any seeming fault in the breast, it is that the sides are a little too flat. It will appear, however, that this does not interfere with feeding, while a deep, although somewhat flat chest is best adapted for speed.

The two last ribs are particularly bold and prominent, leaving room for the stomach and other parts concerned in digestion to be fully developed.

The hips, or huckles, are high up, and on a level with the back, whether the beast is fat or lean.

The hind quarters, or the space from the hip to the point of the rump, are particularly long and well filled up—a point of importance both for grazing and working. It leaves room for flesh in the most valuable part, and indicates much power behind, equally connected with strength and speed. This is an improvement quite of modern date. The fullness here, and the swelling of the thigh below, are of much more consequence than the prominence of fat which is so much admired on the rump of many prize cattle.

The setting on of the tail is high, on a level with the back, rarely much elevated or depressed. This is another great point, as connected with the perfection of the hind quarters.

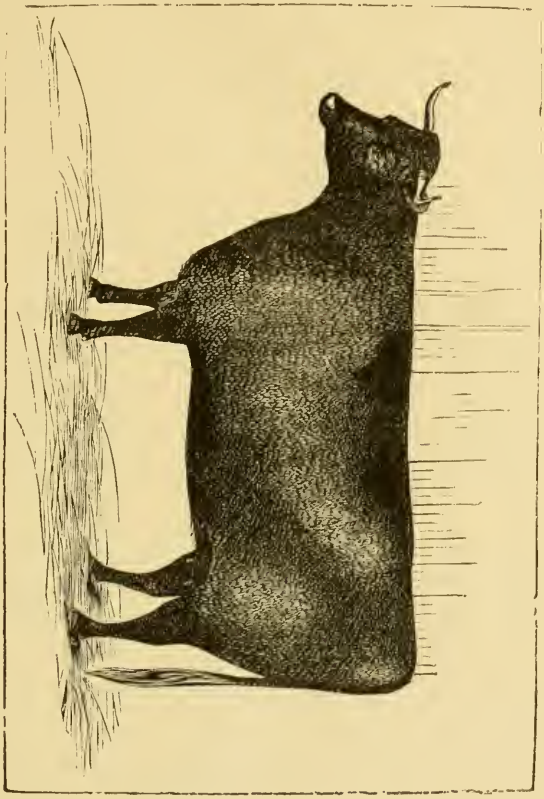
The tail is long and small, and taper, with a round bunch of hair at the bottom."

X. The Devon Cow.

We have stated that the bulls are smaller than the oxen. All steers when mature, may be fatted to greater weights than the bulls, whatever the breed. In the Devons, the increased size of the steers is especially noticeable. The Devon cows are also naturally smaller than the bulls, but especially elegant in their compact, rounded forms, constancy and beauty of color, and are noted for docility of temper when kindly treated and for their active, ardent temperaments. They will resent abuse, for they have the courage of the blooded horse. There is no more beautiful picture than a herd of Devon cows in the pasture, for there is no animal more elegant in form. Yet small as the cows seem, put them on the scale, and the person not used to judge them will be surprised at their weight.

All Devons are noted for their round, full, clear eyes, the golden circlet about the eyes, and the yellow skin of the inside of the ears, as well as for the orange or yellow-colored muzzle. The cow is particularly noticeable in these characteristics. Add to this their cheerful and intelligent

countenance; the clean jaws, throat and dewlap; the magnificent loin; the round barrel; the muscular hind quarter, quite free from angles of any kind; the long, tapering tail; and for elegance, fine flesh and great working powers, the Devons have no superiors among cattle.



IMPROVED DEVON COW.

XI. Mr. Allen's Testimony.

Let us see what the venerable editor of the Short-Horn Herd-Book says of them as working oxen:

They are, among cattle, what the thoroughbred is among horses. According to their size, they combine more fineness of bone, more muscular

power, more intelligence, activity, and "bottom," than any other breed. They have the slanting shoulder of the horse, better fitted to receive the yoke, and carry it easier to themselves than any others, except the Herefords.

With all workers of oxen, the nearer the beast approaches in shape, appearance, and action to the Devon, the more valuable he is considered, according to weight. For ordinary farm labor, either at the plow, the wagon, or the cart, he is equal to all common duties, and on the road his speed and endurance are unrivalled. It is in these qualities that the New England oxen excel others of the country generally, and why the people of that section often call their red oxen "Devonshires," when they cannot, to a certainty, trace any, or but a small portion of that blood in them, only by a general appearance and somewhat like action.

XII. They are Active and Handy.

For active, handy, labor on the farm, or highway, under the careful hand of one who likes and properly tends him, the Devon is everything that is required of an ox, in docility, intelligence, and readiness, for any reasonable task demanded of him. Their uniformity in style, shape, and color, render them easily matched, and their activity in movement, particularly on rough and hilly grounds, gives them, for farm labor, almost equal value to the horse, with easier keep, cheaper food, and less care. The presence of a well conditioned yoke of Devon cattle in the market place at once attests their value, and twenty-five to fifty dollars, and even higher prices over others of the common stock, are freely given by the purchaser.

The Devon, in his lack of great size, is not so strong a draught ox as some of the other breeds—the Herefords, for instance—or perhaps some of the larger of the common cattle; but, "for his inches," no horned beast can outwork him. On light soils, and on hilly roads, none other equals him, although we intend to give all their due share of merit.

XIII. In The First Class for Beef

We must place the Devon in the first class, for fineness of flesh and delicacy of flavor. Its compact bone gives it the one, and its rapid and thorough development under good feeding gives it the other. In growth and size it matures almost, equal to the Short-Horn, and its meat is finer grained, juicy, and nicely marbled, (the lean and fat intermixed.) In the London markets, Devon beef bears the highest price of any, except the Highland Scot—usually a penny a pound over that of larger breeds, and our American butchers quickly pick the Devons from a drove, when they can find them, before most others. They feed well, take on flesh rapidly, and in the quality of their flesh are all that can be desired.

XIV. Weights of the Devons.

While the Devons are called small cattle, they are only relatively so in comparison with Short-Horns and Herefords. A full-grown ox in good condition will weigh from 1,400 to 1,600 pounds, and when well-fattened they will reach 2,000 pounds. The cows will weigh from 800 to 1,100 pounds, and the bulls 1,200 to 1,400. We bred one that at 8 years old weighed 1,819 pounds, and he was as extraordinary in his fineness and style, as a premium taker, as he was in weight; not large to look at, but weighing like a lump of lead.

XV. Sussex Cattle.

Sussex also has long been noted for a breed of middle-horned cattle—all red, but lighter in color than the Devons, larger and in every way coarser. Still they are better milkers than the Devons and fatten kindly. There are a number of breeds allied to the Devons or descended from them in England. The Sussex is one of these breeds.

XVI. The Sussex Color.

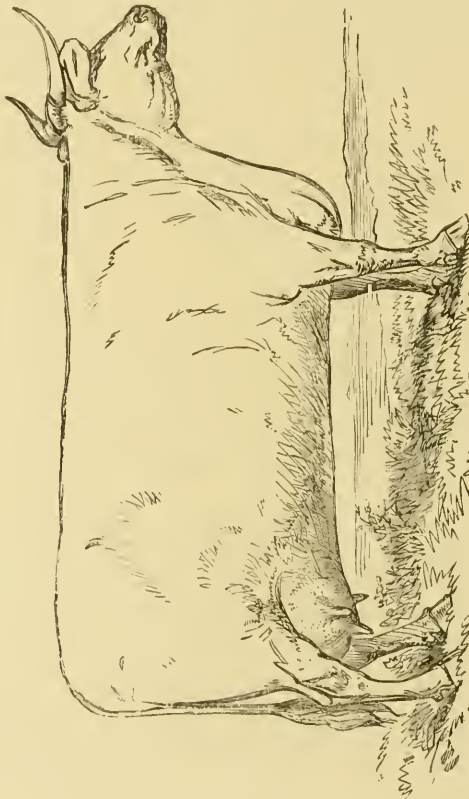
The color is a light chestnut or blood bay, much lighter than the true North Devon, but fully as uniform. The cut of a Sussex cow will, with the description given below, serve to explain the points of difference. They are mentioned here mainly, if not solely, for the reason that they have been sold as Devons. If you buy Devons, or any other highly-bred stock, be sure there is no stain in the pedigree. It is a matter of the utmost importance to the breeder of high-caste cattle.

XVII. Distinguishing Marks of the Sussex.

On this subject Youatt says: "The horns are more tapering, pushing farther forward, and turning up more. The head is small and well formed, the eye full, large and mild in the ox, but rather wild and unquiet in the cow. The throat is clean and the neck long and thin, but coarser than in the Devon. The shoulder is wider and rounder on the withers; straighter from the top of the withers towards the back, and carries much flesh, giving too much weight to unprofitable parts. On the other hand, the barrel is round and deep, the back straight, and the back-bone entirely hidden by the muscles on each side. The heart and lungs are full and large, and the belly and flank capacious. The barrel is well-ribbed home. The loins are wide, the hip-bone low, free from raggedness, large, and well spread, and the space between the hips well filled up. The tail, which is fine and thin, is set on lower than in the Devon, yet the rump is nearly as straight, for the deficiency is supplied by a mass of flesh and fat swelling above. The hind quarters are cleanly made, and if the thighs appear to be straight without, there is plenty of fullness within.

XVIII. The Sussex Cow.

"The cows have fine hair, a mellow, rather than thin skin; a small teat; horns fine, clean, and transparent, which reach forward from the head and turn up at the tips; the neck is thin and clean; back and belly



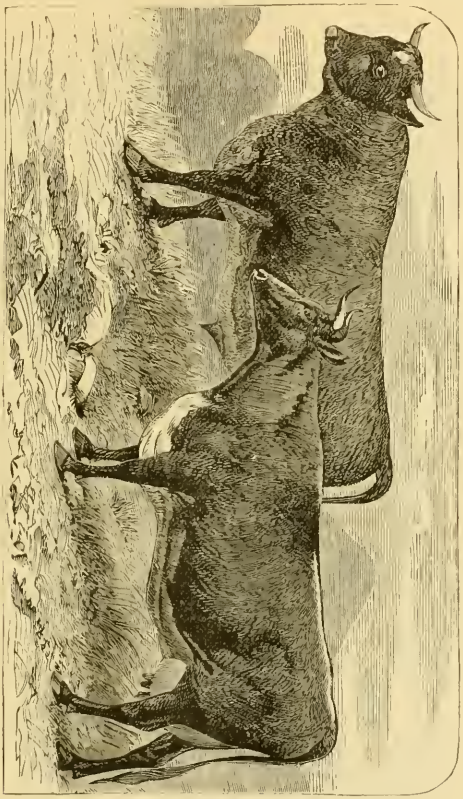
A SUSSEX COW.

straight; ribs round and springing out well; shoulder flat, but projecting at the point.

Hips and rump wide; the tail set on level with the rump, and the carcass large; the legs are rather short and fine.

The cows are not good milkers; they are often uneasy in the pasture, and often unquiet in temper."

They have been exhibited and sold as Devons in the United States, a thing which, of course, none but the most unprincipled of men would at-



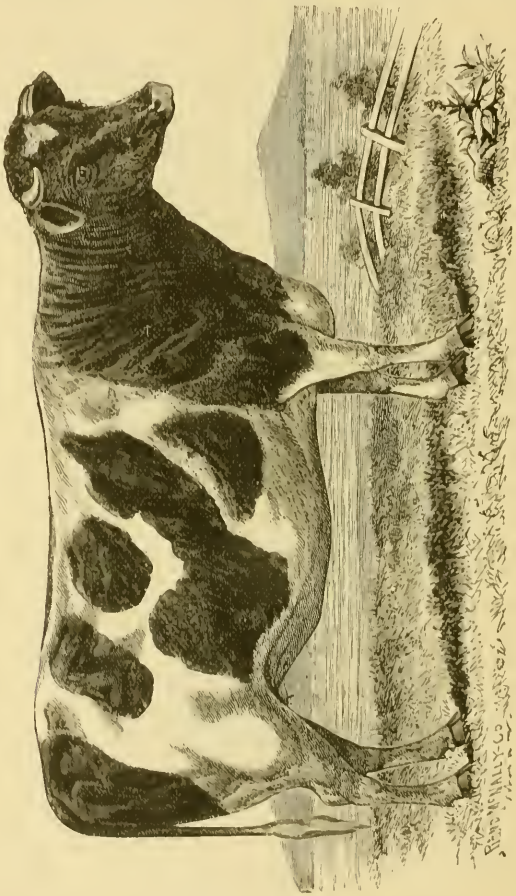
GLAMORGAN CATTLE.

tempt. Give them a wide berth. They have little or no value in this country among better cattle.

XIX. Glamorgan Cattle.

The cattle of Glamorgan, Wales, are noted for good messes of milk, for docility, ability to forage for themselves on their native hills, and for

taking on flesh kindly when dry. They are undoubtedly of Devon origin and belong to the Middle-Horns. They are an ancient race, and have been preserved pure in their native region, but are little known away from there. Occasional specimens have been imported to the United



MODEL HOLSTEIN HEIFER.

States, more as curiosities than for intrinsic value, either for milk or beef, when there are so many superior breeds in either direction. The illustration shows their characteristics perfectly.

CHAPTER IX.

POLLED CATTLE.

I. POLLED CATTLE IN GENERAL.——II. THE GALLOWAYS.——III. POINTS OF THE GALLOWAY.——IV. THE LIMBS AND HEAD.——V. THE SKIN.——VI. THE COLOR.——VII. THE GALLOWAYS IN AMERICA.——VIII. POLLED ANGUS CATTLE.——IX. COLOR OF THE POLLED ANGUS.——X. ANGUS COWS AS MILKERS.——XI. THE ANGUS COMPARED WITH THE GALLOWAY.

I. Polled Cattle in General.

Of the various breeds of polled or hornless cattle, however good in England, none have proved valuable in the United States and Canada, except the Galloways and the Polled Angus. Of these only the Galloways have been at all widely disseminated. Docility of temper even among old bulls; the little space taken up in the feeding stalls, on account of their mild disposition and absence of horns; their hardiness; the ease with which they take on flesh, and the thickness and fine quality of the beef are some of the principal characteristics of excellence in polled cattle.

II. The Galloways.

For the colder and hilly districts, when all cattle must be protected in winter, and in all regions where the Short-Horn proves too tender, the Galloway cattle are steadily gaining in favor. They are essentially beef cattle, it being unusual for the cows, even under good keeping, to give more than twelve quarts of milk a day, and the average is given at six or eight quarts. But the milk is rich, yielding a pound of butter, according to English authorities, to eight or ten quarts of milk. The cows, as a rule, go dry for two or three months in the year, even under the best of management.

It has been said of them that there is, perhaps, no breed of cattle which can be more truly said to be indigenous to the country, and incapable of improvement by any foreign cross, than the Galloways. The Short-Horns almost everywhere else have improved the cattle of the districts to which they have traveled; at least in the first cross produced manifest improvement; but even in the first cross, the Short-Horns have done little good in Galloway, and, as a permanent mixture, the choicest short-horn bulls have manifestly failed. The intelligent Galloway breeder is now perfectly satisfied that his stock can only be improved by adherence to the pure breed, and by care in the selection.

III. Points of the Galloway.

Mr. L. B. Allen gives, on the authority of an eminent judge and breeder, the characteristics of this breed, as follows:

The Galloway cattle are straight and broad in the back, and nearly level from the head to the rump. They are round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins. They are broad in the loin, without any large projecting hook bones. In roundness of barrel, and fullness of ribs, they will compare with any breed, and also in the proportion which the loins bear to the hook bones, or protuberances of the ribs. When viewed from above, the whole body appears beautifully rounded, like the longitudinal section of a roller. They are long in the quarters and ribs, and deep in the chest, but not broad in the twist. The slightest inspection will show that there is less space between the hook or hip bones and the ribs than in most other breeds, a consideration of much importance, for the advantage of length of carcass consists in the animal being well ribbed home, or as little as possible lost in the flank.

IV. The Limbs and the Head.

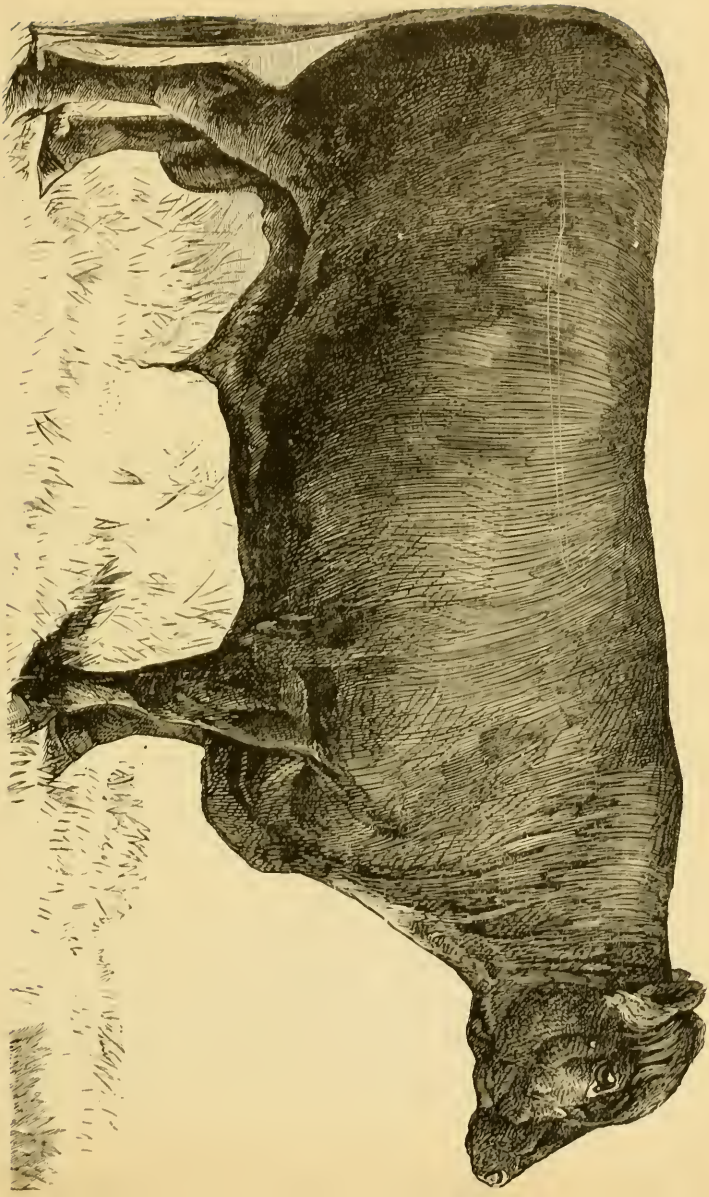
The Galloway is short in the leg, and moderately fine in the shank bones,—the happy medium seems to be preserved in the leg, which secures hardihood and a disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep, broad and capacious chest. He is clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest, and close, compact form of the breed. The neck of the Galloway bull is thick, almost to a fault. The head is rather heavy; the eyes are not prominent, and the ears are large, rough, and full of long hairs on the inside.

V. The Skin.

The Galloway is covered with a loose, mellow skin of medium thickness, which is clothed with long, soft, silky hair. The skin is thinner than that of the Leicestershire, but not so fine as the hide of the improved Durham breed, but it handles soft and kindly. Even on the moorland farms, where the cattle, during the greater part of the year, are fed on the scantiest fare, it is remarkable how little their hides indicate the privations they endure.

VI. The Color.

The prevailing and fashionable color is black—a few are of a dark brindle brown, and still fewer are speckled with white spots, and some



A GALLOWAY BULL.

of them are of a dun or drab color, perhaps acquired from a cross with the Suffolk breed of cattle. Dark colors are uniformly preferred, from the belief that they indicate hardiness of constitution.

VII. The Galloways in America.

The Galloways are said to have been first introduced into Canada about the year 1850. Since that time they have steadily increased by breeding and subsequent importations, and of late years a good many have been bred in the Northwestern States, where they are greatly liked for their many good qualities, and now have a regular series of prizes offered for them at all our principal fairs. They are also attracting attention in the Southwest as a means of improving the Texan cattle. To our mind, they should prove valuable in reducing the horn, refining the bone, and thickening the body of the Southwestern cattle, and, especially, in breeding out the wildness and viciousness of the Texans.

VIII. Polled Angus Cattle.

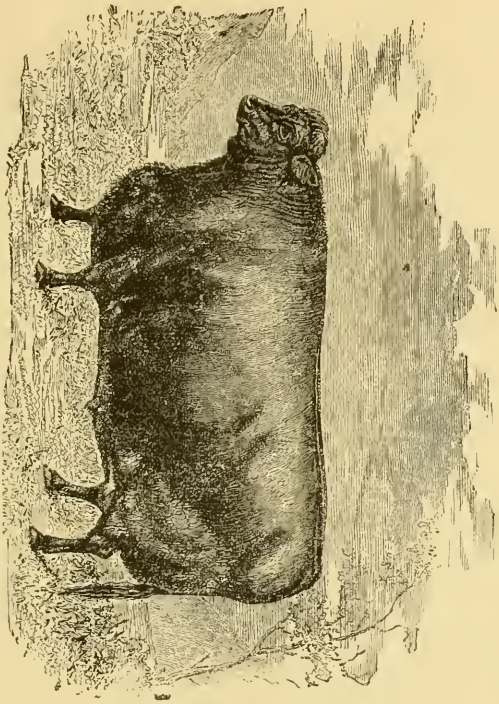
This is a breed yet rare in America, though much thought of in Scotland. Finer in their make up than the Galloways, of which they are relatives, they have many admirable qualities to commend them in hilly districts. There have always been some polled cattle in Angus; the country people call them *humlies* or *dodded* cattle. Youatt says that their origin is so remote, that no account of their introduction into England can be obtained from the oldest farmers or breeders. The attention of some enterprising agriculturists appears to have been first directed to them about sixty years ago, and particularly on the eastern coast, and on the borders of Kincardineshire. Some of the first qualities which seem to have attracted the attention of these breeders were the peculiar quietness and docility of the doddies, the easiness with which they were managed, the few losses that were incurred from their injuring each other in their stalls, and the power of disposing of a greater number of them in the same space.

A few experiments upon them developed another valuable quality—their natural fitness for stall-feeding, and the rapidity with which they fattened. This brought them into repute.

They have much of the Galloway form, and by those unaccustomed to cattle would be often mistaken for the Galloways. A good judge, however, would perceive that they are larger, somewhat longer in the leg, thinner in the shoulder, and flatter in the side.

Climate and management have caused another difference between the Angus doddies and the Galloways. The Galloways have a moist climate; they have a more robust appearance, a much thicker skin, and a rougher

coat of hair than the Angus oxen. The angus cattle are regularly kept in straw yards during six months of the year, receiving turnips with their fodder every day, and in summer are grazed on dry and warm pastures. By this mode of treatment they look and feel more kindly than the Galoways.



POLLED ANGUS COW.

IX. Color of the Polled Angus.

The greater part of them are black, or with a few white spots. The next general color is yellow, comprehending the brindled, dark red, and silver-colored yellow. They are a valuable breed, and have rapidly gained ground on the horned cattle, and become far more numerous, particularly in the Lowlands; and when the agriculturist now speaks of the Angus breed, he refers to the polled species.

X. Angus Cows as Milkers.

The quantity of milk yielded by the dairy cows is various. In the hilly districts from two to three gallons are given per day, but that is very rich. In the lowlands the cows will give five gallons during the best of the season. The cows of this district were formerly regarded as some of the best dairy-cows in Scotland, but since the breed has been more improved, and greater attention paid to the fattening qualities, they have fallen off in their character for the pail.

XI. The Angus Compared with the Galloway.

Thus while Angus cattle have great value in their native climate, they would seem to possess no value in this country over the Galloway. When removed to a warmer latitude, in England, they degenerate, and the probability is, that in this country they will not prove so good as the Galloways, though it is probable that they will find admirers on account of the greater excellence of their flesh.

CHAPTER X.

DAIRY CATTLE—THE AYRSHIRES.

I. THE ANTIQUITY OF AYRSHIRE CATTLE.——II. AYRSHIRE ANCESTRY.——III. THE AYRSHIRE AS A MILKER.——IV. QUALITY OF THE MILK.——V. MR. YOUATT'S OPINION.——VI. QUALITY OF THE FLESH.——VII. THE AYRSHIRES IN AMERICA.——VIII. AYRSHIRE POINTS EIGHTY YEARS AGO.——IX. THE AYRSHIRE OF TO-DAY.——X. POINTS OF AYRSHIRE CATTLE.——XI. ESCUTCHEON OR MILK MIRROR.——XII. THE POINTS SUMMED UP.——XIII. THE BODY.——XIV. THE SKIN.——XV. MILK POINTS.——XVI. THE HEAD.——XVII. THE NECK, BODY AND LIMBS.——XVIII. IMPORTANCE OF GOOD TEATS.——XIX. COLOR, STYLE AND CONDITION.

I. The Antiquity of Ayrshire Cattle.

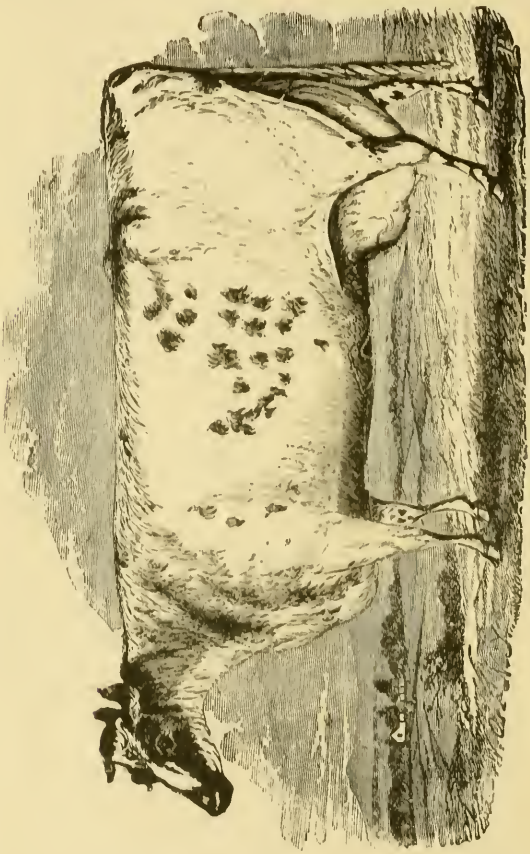
There are few climates better adapted to dairying than Ayrshire, in Scotland, and no other part of Great Britain has so long been noted for its superior milking cows. The climate is moist, with frequent soft rains and no severely cold weather in winter. The grasses therefore are naturally succulent and sweet.

The origin of the Ayrshire cow is in doubt. In 1733 it is recorded that no such breed existed in Scotland. Mr. Robertson, writing in 1703, credits the introduction of Ayrshire cattle into Scotland, on the authority of Mr. Bruce Campbell, to that Earl of Marchmont who succeeded his title in 1724, and died in 1740.

II. Ayrshire Ancestry.

In relation to their origin Mr. Robertson says: From what particular part of the country they came, there appears no evidence. My own conjecture is, that they are either of the Holderness breed, or derived from it; judging from the varied color, or from somewhat better evidence, the small head and slender neck, in which they bear a striking resemblance to them. These cattle, from which, by crosses with the native breed, the present improved Ayrshire arose, were first introduced on Lord Marchmont's estate in Berwickshire. A bull of the new stock was sold to Mr. Hamilton of Sundrum; then Mr. Dunlop, in Cunningham, imported some of the Dutch cattle, and their progeny was long afterwards distinguished by the name of the Dunlop cows. These were the first of the improved, or stranger breed, that reached the baillery of Cunningham. Mr. Orr, about the year 1767, brought to his estate of Grougar, near Kilmarnock, some fine milch cows of a larger size than any which had

been on the farm. It was not, however, until about 1780, that this improved breed might be said to be duly estimated, or generally established in that part of Ayrshire, although they had begun to extend beyond the Irvine, into Kyle.



MODEL AYRSHIRE COW.

About 1790, according to Mr. Aiton, Mr. Fulton from Blith, carried them first into Carrick, and Mr. Wilson, of Kilpatrick, was the first who took them to the southern parts of that district. So late as 1801, they were introduced on the estate of Penmore, on the Stonehar, and they are

the established cattle of Ayrshire; they are increasing in the neighboring counties, and have found their way to most parts of Britain.

III. The Ayrshire as a Milker.

The quantity of milk yielded by the Ayrshire cow is, considering her size, very great. Five gallons daily, for two or three months after calving, may be considered as not more than an average quantity. Three gallons daily will be given for the next three months, and one gallon and a half during the succeeding four months. This would amount to more than 850 gallons; but, allowing for some unproductive cows, 600 gallons per year may be considered as the average quantity obtained annually from each cow.

IV. Quality of the Milk.

The quality of the milk is estimated by the quantity of butter or cheese that it will yield. Three gallons and a half of this milk will yield about a pound and a half avoirdupois, of butter. An Ayrshire cow may be reckoned to yield 257 English pounds of butter per annum, or about five pounds per week all the year round, besides the value of the buttermilk and her calf.

V. Mr. Youatt's Opinion.

Mr. Youatt, writing in the early part of the century says: They will feed kindly and profitably, and their meat will be good. They will fatten on farms and in districts where others could not, except supported by artificial food. They unite, perhaps, to a greater degree than any other breed, the supposed incompatible properties of yielding a great deal of milk and beef. It is, however, on the inferior soil and the moist climate of Ayrshire, and the west of Scotland, that their superiority as milkers is most remarkable. On their natural food of poor quality they give milk abundantly and long, and often until within a few days of calving; but when they are moved to richer pasture, their constitution changes, and they convert their food more into beef. It cannot be denied that even in this tendency to fatten when their milk begins to fail, or which often causes it to fail, the Ayrshires must yield to their forefathers, the Highlanders, and to their neighbors, the Galloways, when put on a poor soil; and they will be left considerably behind their Short-Horn sires when transplanted to luxuriant pasture. It will be long, perhaps, before they will be favorites with the butchers, for the fifth quarter will not usually weigh well in them.

VI. Quality of the Flesh.

Their fat is mingled with the flesh rather than separated in the form of tallow; yet this would give a more beautiful appearance to the meat, and

should enhance its price to the consumer. This fact of their flesh being so fully marbled with fat, would be an important consideration at the present time, if not when Mr. Youatt wrote, for tallow is not so valuable now as formerly, since the disuse of tallow candles, and this marbled flesh is much sought by butchers.

VII. The Ayrshires in America.

Mr. Allen, writing in 1867 in relation to their importation into America says: The Ayrshires first began to be imported into the United States about the year 1831. They were somewhat different in appearance from the latter importations, being in color usually deep red, or brown, flecked with white, of rather plain look, and having mostly black noses. In recent importations, or those within the last fifteen years, many of them have assumed more the Short-Horn colors, the red in them being of a lighter shade, and less of it—white being the prevailing color in many—and some of them a lively patched roan, with yellow noses, and handsome, and more symmetrical forms, but alike bearing the marks of good milkers.

VIII. Ayrshire Points Eighty Years Ago.

According to Mr. Aiton, the Ayrshire as it was found in its native country and in its improved form, in the beginning of the present century had these characteristics: Head small, but rather long and narrow at the muzzle; the eye small, but smart and lively; the horns small, clear, crooked, and their roots at a considerable distance from each other; neck long and slender, tapering toward the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind, the joints rather loose and open; carcass deep, and pelvis capacious, and wide over the hips, with round fleshy buttocks; tail long, and small; legs small and short, with firm joints; udder capacious, broad and square, stretching forward, and neither fleshy, low hung, nor loose; the milk-veins large and prominent; teats short, all pointing outward, and at considerable distance from each other; skin thin and loose; hair soft and woolly. The head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned.

IX. The Ayrshire of To-Day.

The Ayrshire of to-day is noted for giving a large quantity of milk, rich in both butter and cheese; and also for the wonderful development of the thighs, the bulls being selected with reference to their feminine appearance. They are docile in temper, hardy, sound-constitutioned; the bulls broad in the hook bones and hips, and full in the flanks. Of late years there have been a number of herds introduced into the West, and

AYRSHIRE BULL AND COW.

wherever used they have been greatly liked. Careful selection has done much to keep down their fattening qualities on full feed, and it is probable that there is no strictly dairy cow that to-day combines so many good qualities as the Ayrshire cow.

X. Points of Ayrshire Cattle.

Dr. G. Lewis Sturtevant, of Massachusetts, a scientific investigator, and careful farmer, who has given particular attention to the characteristics and breeding of Ayrshire cattle in New England, minutely describes the points of Ayrshire cattle. With slight variations the same rules will apply to the Dutch or Holstein cattle to be hereafter noticed:

The usefulness of the dairy cow is in her udder, and toward the udder, its shape and its yield, all the capabilities of the cow should be directed. We may first view it as a reservoir for the milk. As such, it must be large and capacious, with broad foundations, extending well behind and well forward, with distinct attachments; broad and square, viewed from behind, the sole level and broad, the lobes even-sized, and teats evenly distributed; the whole udder firmly attached, with skin loose and elastic. Such a form gives great space for the secreted milk, and for the lodgment of the glands, while allowing the changes from an empty to a full vessel. The glands should be free from lumps of fat and muscle, well set up in the body when the cow is dry, and loosely covered with the soft and elastic skin, without trace of flabbiness. Such a covering allows for extension when the animal is in milk, while the glands are kept in proximity with the blood-vessels that supply them.

XI. Escutcheon or Milk Mirror.

I think a broad escutcheon is fully as good a sign as a long one; that quantity or quality mean more than shape, yet I would not discard the shape entirely. The udder and its dependencies, the milk veins, and the escutcheon mark, may be considered the foundation of the Ayrshire cow. These influence profit, and also the shapes of the body and the form of the animal. The milk vessel is placed in the pubic region of the cow, and is protected on either side by the hind limbs. The breadth of its attachments secures breadth of body, and the weight requires also a depth of quarter and of flanks. The breadth below requires breadth of hip above, and length of loin here appears related to length of pelvis. So much for the physical portion. The physical function of milk-producing demands a great and continuous flow of blood, for it must not be forgotten that milk is blood, so to speak. This flow is dependent on the supply of food, and on the facilities of digestion. To gain this, a large body is required in order to hold the suitable digestive organs. To gain the most of our blood after it has absorbed the chyle from the digestive

organs, reason shows that it should find its way freely and speedily through the system on its labors of supply and removal, cleanse itself in the lungs, and again pass on to its duties. All this points to a healthy heart, not cramped, and lungs of sufficient capacity; for the yield of milk drains much nutriment from the system, and the constitution must needs have the vigor given by healthy and active heart and lungs. In this way the chest is correlated with the udder.

The reproductive functions require hook bones of good size, and a broad pelvis is desirable, as underlying within are the generative organs. Defects here are to be shunned.

XII. The Points Summed Up.

The points of the Ayrshire cow, as given by the Ayrshire Agricultural Society, and the New York State Agricultural Society, have been summed up as follows:

XIII. The Body.

The whole fore-quarters thin in front, and gradually increasing in depth and width backward, yet of sufficient breadth and roundness to insure constitution; back should be straight and the loins wide, the hips rather high and well spread; pelvis roomy, long, broad and straight, hook bones wide apart, quarters long, tolerably muscular, and full in their upper portion, but moulding into the thighs below, which should have a degree of flatness, thus affording more space for a full udder; the flanks well let down, but not heavy; ribs, behind, springing out very round and full, affording space for a large udder—the whole carcass thus acquiring increased volume toward its posterior portion.

XIV. The Skin.

In connection with the body and the udder, the skin is of great value in assisting our judgment. Between the portion of the external covering used for leather, and the muscle, there occurs a layer of cellular tissue, which contains a larger or smaller amount of fat cells, and the mellow handling caused by these cells indicates a free circulation throughout this meshwork.

The skin varies from a thin, papery hide, covered with silky hair, to a thick, supple, elastic hide, well coated with hair, on the one hand, and a similar variation, with harsh hair and coarseness, on the other. The thin, papery hide indicates quick fattening and a delicate constitution; thick, elastic hide, cushioned on fat, and which on the flank comes into the hand almost without grasping, indicates the height of vigor, accompanied by the fattening tendency, and the possessor of this handling endures climatic changes, low quality in his food, and neglect, with

remarkable hardihood, and quickly responds to full feed and good care. The harsh handler is a dull feeder, consumes much food, and generally contains more than a just proportion of offal or waste. In the Ayrshire cow we desire neither of these extremes, for it is in the milk product that we wish the food to be utilized, and it is almost an unchanging law of nature, that deficiency in one direction must be compensated for by excess in another direction, and *vice versa*. At any rate, the cow that lays on fat too quickly is seldom a first class milker; and how well known is it that the cow of large yield milks down her condition. A cow that has a moderately thin, loose skin, of sufficient elasticity and suppleness of touch, without being fat-cushioned, as it were, with hair soft and mossy or woolly, if of correct form otherwise, will usually milk a large quantity, and when she becomes dry, will rapidly come into condition. In truth, the handling of the Ayershire cow must be good; it cannot be too good; but it must not be of exactly that quality sought for in the grazing breeds.

There, as everywhere, the dairyman must keep to his line; milk, not fat, is his profit; and in seeking excess of both, he will be liable to fall below the average of either.

XV. Milk Points.

It is an axiom of breeders to diminish the useless parts of an animal as much as possible, or, in other words, to reduce the proportion of those parts not conducive to profit to as great extent as possible. Applying this rule to a dairy breed, we should desire a small neck, sharp shoulders, small brisket and small bone. Moreover, small bone usually accompanies thrift, and is universally found in improved breeds. We thus have a reason for these other Ayrshire points:

Shoulders lying snugly to the body, thin at their tops, small at their points, not long in the blade, nor loaded with muscle; brisket light; neck of medium length, clean in the throat, very light throughout, and tapering to the head; tail long and slender; legs short, bones fine, joints firm.

XVI. The Head.

The head should be small, in shape either long and narrow, or broad in the forehead and short, according to the type of animal preferred by the breeder, generally preferred somewhat dishing; the nose tapering to an expanded muzzle, with good clean nostrils. Opinions differ as to the general shape of the head. A broad forehead and short face occurs more frequently in bulls, and are generally esteemed a masculine characteristic; a more elongated face is called feminine. Yet some families of well-bred and good milking Ayrshire cows have the broad and short head, and such were, at one time, if not now, the favorites in the show-yard in Scotland.

The eye should be moderately full, lively yet placid looking. The eye is a mirror of the disposition, and interprets the character of the cow; a fretful, irritable animal is seldom a quick fattener, and usually disappoints at the pail. It also gives expression to the features, and physiognomy aids our judgment.

The ears should be of a good size, but thin, and their skin of rich yellow color. Coarse ears are usually found on ill-bred animals, and these may be considered, to a certain extent, indicative of general coarseness. The color of the skin, as shown inside the ear, is usually considered indicative of the richness of the milk in butter.

The horns should be of medium size, of fine texture, with an outward and upward turn, or inclining upwards and curving slightly inwards, according to the taste of the breeder. They should be set on rather widely apart. A coarse horn may indicate a coarse and thick hide, as there seems an intimate relation between the composition of the horn, hair, and hide, and the influence of climate on horn and hair gives an appearance oftentimes of correlation between the two.

XVII. The Neck, Body and Limbs.

The neck should be of medium length throughout, and tapering to the throat, which should be clean or free from loose, hanging skin. Yet too thin a neck is not desirable, as it usually indicates a delicate animal. A thick-set neck, well covered, yet not overladen with muscle, accompanies hardiness and vigor of constitution.

The junction of the neck with the body and over the shoulders is called the crops; on a horse it would be called the withers. A hollow behind this point is a never-failing sign of weakness. The crops should blend in easily with a thin shoulder, lying snugly to the body. This shoulder and a well defined spine produce the sharpness of shoulder so much admired. The back should be straight, with spine well defined, especially forward. The tail long, firm in the bone, and set on a level with the back, without depression or notch. A fine tail usually accompanies fine bone, and the fine bone is not only decrease of offal over heavy limbs, but accompanies early maturity, and a tendency to thrift. The limbs should be fine-boned, flat-boned, and with joints of moderate size. On the forward limbs the cow should stand low. Large joints and round bones are found very frequently on dull feeders, and on animals of little profit.

XVIII. Importance of Good Teats.

The teats should be of medium length, evenly set, and project slightly outward when the bag is full, of even thickness throughout, and of fine texture. They should be placed about one-third of the length of

the "vessel" apart in one direction, and about one-half the other. When the udder is not distended, they should hang perpendicularly. Large teats, however desirable to the milker, are usually accompanied by coarseness of build in the cow. They are seldom found on well-bred animals, yet exceptionally they occur, and are much liked. A teat should be large enough to grasp, say from two to two and a half inches in length. A shorter one would be an objection; with larger, I should fear coarseness.

XIX. Color Style and Condition.

In color the Ayrshires vary greatly. Brown, red, and white appears to good advantage, and is fashionable. A good quantity of white, well distributed, adds style and showiness to the animal. Yellow and white is frequently seen, yet while this color is sometimes stated as indicating lack of hardiness, I am not aware of any proofs or argument having been brought forward to support this view. Color is as yet a matter of taste, for its correlations are hardly guessed at; and from almost pure black, through the reds to almost pure white, are colors found on the best cows. Black spots on the skin, barely perceptible through the hair, often occur on the best cattle. Strawberry blotched and red and white are perhaps the more common colors. A self-colored animal, or a roan, or animal with white on the ears, the writer has never yet seen among the Ayrshires in Scotland or in this country, when the pedigree was unquestionable.

The carriage should be light and active, the head well up, and the hind legs should not cross in walking. The condition should be neither fat nor lean, but that average which a good cow holds when in good flesh at calving, liberally fed while in milk.

In selecting Ayrshires, if these points are attended to, and if the breeder has carefully studied what we have previously written in relation to raising cattle in general, there will be no difficulty about the selection of superior animals.

CHAPTER XI.

DAIRY CATTLE—THE DUTCH BREEDS.

I. ANTIQUITY OF DUTCH CATTLE AS A DISTINCT RACE.——II. FRIESIAN AND BATAVIAN CATTLE.——III. DUTCH CATTLE OLDER THAN THOSE OF HOLSTEIN.——IV. ESTABLISHMENT OF REGULAR CATTLE MARKETS.——V. IMPORTATION OF DANISH CATTLE INTO FRIESLAND.——VI. FACTS ABOUT DUTCH CATTLE.——VII. VARIETIES DESCRIBED.——VIII. RACES OF DUTCH CATTLE.——IX. DR. GEORGE MAY'S TESTIMONY.——X. BREEDS OF NORTH AND SOUTH HOLLAND AND WEST FRIESLAND.——XI. THEIR COLOR AND FORM.——XII. YIELDS OF MILK.——XIII. FEEDING QUALITIES.——XIV. DUTCH CATTLE AN ARTIFICIAL BREED.——XV. THE EARLIEST IMPORTATIONS.——XVI. THE LEROY IMPORTATION.——XVII. THE CHENERY IMPORTATION.——XVIII. WHAT PROF. ROBERTS SAYS.——XIX. MEASUREMENTS ADOPTED FOR DUTCH FRIESIAN CATTLE.——XX. HOW TO SELECT DAIRY COWS.

I. Antiquity of the Dutch Cattle as a Distinct Race.

The cattle now called Dutch undoubtedly trace, in an unbroken line, farther back than any other race in repute among breeders. The Friesians and Batavians long ago inhabited Holland. The history of the Friesians dates back to 300 years before Christ, and they were known more than 2,000 years ago as herdsmen, hunters and fishermen. The Batavians are said to have come some 200 years later, or 100 years before Christ. Prof. G. J. Hengerveid, of the Royal Veterinary Institute at Utrecht, Netherlands, in an exhaustive letter to the United States Consul in 1872, goes over the whole history, and without other preface we extract such portions as seem pertinent to the matter in hand:

The lands of the Friesians comprised the whole country to the north of the Rhine as far as the shore of the North Sea, to which West and East Friesland belonged, composing the present Dutch provinces of Groningen, Friesland, Dreuthe, and North Holland, besides the provinces of Utrecht, Overyssell, and a part of Gulderland and South Holland. Of all these provinces Groningen alone appertained to East Friesland.

II. Friesian and Batavian Cattle.

Tacitus says of the Friesians and Batavians that they owned cattle, not excelling in beauty, but in number. He further states, as does also Julius Cæsar, that the Friesians and Batavians paid each other in cows, sheep and goats, and gave likewise to their children as dowry, oxen adapted to the yoke and plough, cattle and horses. When they were subdued by the Romans in the first century of our era, the conquerors imposed upon the Friesians an annual tribute, consisting of cow-hides and meat. The Friesians and Batavians applied themselves to the draining

of their marshy lands and their islands, and created meadows on the reclaimed soil. Something is even known regarding the color of their cattle, namely, that they held those of a white color in religious veneration. The Friesians, from Oldenburg and the country near the mouth of the Elbe, were compelled, through the inclemency of those regions—then in their original condition of low alluvial swamps, inundated at every tide—to desert them. It can also be shown that the inhabitants of this territory were unable to make sure provision for their own wants, because of the robberies and piracies committed by the Normans, by dwellers on the west coast of Denmark, people from Holstein and Schleswig, Jutes and Angles. This was between the eighth and eleventh centuries. Giving due weight to these statements, it cannot be doubted that the cultivation of cattle in the Netherlands existed a long time before such a thing could be thought of in Holstein. It is also quite as certain that the colonies from Friesland, Holland and Westphalia, carried with them their cattle to Holstein.

III. Dutch Cattle Older than those of Holstein.

Hence we see that, first, the Dutch race of cattle date from an older descent than those of Holstein; while, probably, second, the Holstein cattle orginated from the Friesian breed and from that of the Dutch and Westphalia emigrants. After this colonization, we have our attention directed to another remarkable particular in the history of Dutch cattle.

IV. Establishment of Regular Markets.

From the fourteenth on till the eighteenth century, a large number of Danish oxen were annually turned for pasture into the grassy meadows of North Holland, and sold at the weekly North Holland cattle market. The oldest of these cattle markets is that of the city of Hoorn. This market was already established in 1311, and in 1339 the Danes and the inhabitants of the Eyder, were allowed by Albrecht, duke of Bavaria, to hold a weekly market there. In 1605, the Danish cattle market was removed from Hoorn and transferred to Enkhuyzen, when, in 1624, the number of 1,179 oxen were sold. There was also in Amsterdam a lean-cattle market, beginning in the Spring, in the month of April, but held at irregular periods, depending upon wind and weather, when cattle were allowed to be conveyed thither from Denmark and Holstein to graze. These were mostly brought by vessel.

V. Importation of Danish Cattle into Friesland.

In the middle of the eighteenth century, it is mentioned that, owing to the cattle-plague, the people were compelled to import from abroad all kinds of small cattle, chiefly Danish. But, what was remarkable, however

small and ill-favored these animals might be when compared with the handsome Friesian horned cattle, an improvement of food induced a favorable development of body, and, from the mixture of the two breeds, good and choice milch-kine were attained within two or three generations after the introduction of the foreign blood, no matter how much the race had in the beginning deteriorated through the process, and, eventually, the type of Danish and German cattle was quite lost.

VI. Facts about Dutch Cattle.

The chief characteristics of this Friesian breed—its eminent milk-giving and fattening qualities—we find in all the districts mentioned, and extending still farther southward; with this difference, however, that wherever the land is more fertile, the climate milder, and the tending, feeding and breeding of the cattle observed with more care, in that measure, they are more developed, attain larger size, and are of a finer texture.

If the intention be to convey a correct understanding of the true qualities of the several varieties or breeds mentioned in their own dwelling places, it is better that each breed should retain the name by which it is known, and that no collective name, though a historical one, should be given them.

VII. Varieties Described.

In order to be able to readily classify a group of cattle of great extent, possessing the same chief qualities in form and productiveness, Sturm proposed, so long as fifty years ago, to give to a group, subject to the same conditions of soil and climate, a name indicating those conditions, and thus originated Mountain Cattle, Highland Cattle and Lowland Cattle. He also heads each of these divisions by the breed best representing the distinctive feature of its class, *as its type*. It is under the denomination of Lowland Cattle that he places the different breeds of the coast lands along the North Sea. Schmalz, Pabst and many subsequent writers, adopt this classification, some with a few modifications. According to Schmalz's statement, cattle, adopting Sturm's classification, may be distinguished in the following manner:

VIII. Races of Dutch Cattle.

A. Lowland Race.—Primitive cow; Dutch-Friesian cow.

B. Mountain Race.—Degenerate, quite the contrary of A; Swiss cow.

C. Middle Race.—Highland race; forms the transition from A to B; Frankish cow.

To the race A belong the Dutch, as representatives, the Friesian, the Oldenburg, and chiefly all Lowland races bearing the peculiar characteristics which identify it with the place of its sojourn.

This is a purely natural division, and there is not the least arrogance in asserting, what history points out, that the Dutch cattle constitute the type of the oldest, purest, and best breed. All other varieties are of less intrinsic value; they are coarser or smaller, possess less productive qualities, though of local excellence in their native places.

One hears in Europe of "Lowland cattle," but purchases of them for the purpose of improving other breeds have, for the last hundred years, only been made in the chief Netherland provinces, where the choicest cattle of the Lowlands are found. Thus, thousands of Dutch and Friesian cattle are annually sent abroad under the name of *Dutch cattle*.

IX Dr. George May's Testimony.

Dr. George May, director of the agricultural establishment at Weihenstephan, says: The Dutch cattle constitute the type of the properly so-called Lowland race, which extends throughout Netherlands, Flanders, Normandy, Oldenburg, and Denmark. The Oldenburg cattle descended from the Dutch race, and are likewise distinguished as East Friesian cattle, as still partially found in Hanoverian Friesland. In the adjacent parts of Bremen it is called Bremen cattle.

In the transactions of the Ohio Board of Agriculture, 1872, in an article on Dutch cattle, by Professor Furstenburg, we find the following: The breeds of cattle in Holland may be divided according to their locality as follows: 1. The breeds in the provinces North and South Holland and West Friesland. 2. The breeds in the provinces Groningen, Guelderland, Utrecht, and Overyssel. 3. The breeds in the provinces of Seeland. Although these breeds are closely related, still they show differences resulting from keeping and the various purposes for which they are bred.

X. Breeds of North and South Holland and West Friesland.

The breed most renowned in the kingdom for its milk-producing qualities is found in these three provinces. But North Holland in particular is noted for the manner of keeping cattle, which are known by the name of Amsterdam race, being no less remarkable on account of size than for the great production of milk. The pastures of North Holland are said to contain 100,000 morgen (58-100 morgen to an acre): every acre furnishes nourishment for 49-100 head of cattle. The peasants are engaged almost solely in cattle breeding, and the keeping and care which these animals receive here has almost become proverbial on account of its perfection

XI. Their Color and Form.

The cattle here are mostly spotted black and white; however, brown and blue or gray mixed are found. The height is considerable, being not

under two Amsterdam ells, (4 51-100 feet); the length of the body in proportion to the height, the middle part of which is particularly developed, the quarters fleshy, neck rather short than long, with a strong dewlap; head narrow and long, with the forehead slightly depressed; fine horns crooked forward, and large projecting ears. The withers are often narrow; the back, on the other hand, broad across the hips, which are not very prominent; the tail fine and long, with a good tuft of hair; the position of the hind legs strong and straight (not knock-kneed), the hind-quarters broad and roomy, and the bag well developed. The lower part of the legs above the hoofs is invariably white, which is regarded as a sign of the pure unmixed breed. The live weight of the cows is 1,200 to 1,400 pounds; that of bulls reaches 2,000 pounds when full grown and fatted. The cows are usually productive of milk, and give an average of 3,000 quarts and over per annum.

A very excellent milch cow of the Amsterdam race, from the royal cow stable in Eldena, which was brought with a few others to the International Exhibition, took the first premium for milch cows of the Netherland race at the International Exhibition of live stock at Stettin in 1865. This cow, fed in the stall only, gave in one year the great quantity of 6,142 quarts of milk, and kept up afterwards to 4,000 quarts in an equal length of time.

To the breed of North Holland are nearly related those of South Holland and West Friesland, and differ perhaps only in that the latter are larger-boned, and in general of not so pleasing a form. In regard to their milk-producing qualities they are about equal. The manner of keeping the stock, and the use of the milk, is also the same, viz.: the manufacture of cheese, while the calves are raised and sold as young stock at high prices. From these three provinces, the former two of which suffered so much lately from rinderpest, milch cows are bought for the best dairies in Germany.

Holland cattle are well adapted to soiling, although at home they are accustomed to pasturage. They are kept profitably on the latter only when its abundance facilitates grazing and makes corporal exertion unnecessary. Therefore a great error would be made in placing these animals on a scant pasturage, and they are not at all adapted to the pasturage of a light soil. The result of stall-feeding is more favorable, because proper care and fodder can be given to the stock without its exertion. We have received from no other race an equal quantity of milk with the same feed, as years of observation in the cow stable of the Academy at Eldena has shown.

XIII. Yields of Milk.

The yield of milk in 1865 of these races was:

1. Four Toudern cows gave 9,337 quarts, or an average of 2,334 quarts, or 6 3-10 quarts per day for the year. The largest milker gave 2,315 quarts, the smallest, 2,020 quarts.

2. Three Breitenburg cows gave 8,594 quarts, or an average of 2,864 2-3 quarts, or 7 85-100 quarts per day for the year. The largest milker gave 2,946 quarts, the smallest, 2,820 quarts.

3. Three Ayrshire cows gave 5,386 quarts, or an average of 1,795 1-3 quarts, or 4 92-100 quarts per day for the year. The largest milker gave 2,249 quarts, the smallest 1,415 quarts.

4. Twenty-two Holland cows gave 78,100 quarts, or an average of 3,550 quarts, or 9 73-100 quarts per day for the year. The largest milker gave 6,142 quarts, the smallest 2,526 quarts.

The average feed per head in the Winter was daily—10 pounds Summer straw, cut fine; 2 1-2 pounds oat and wheat chaff; 25 pounds beets, 10 pounds hay; 8 pound refuse malt from beer brewery; 3 pounds rye bran. This food is considered about equal to 42 9-10 pounds hay.

During the Summer the cows were fed daily per head 135 pounds green fodder, viz., clover and vetches (of the latter very little was used), and three times a day 8 pounds of hay.

XIII. Feeding Qualities.

Although there is no doubt that the Holland cows eat more, generally, than the smaller Ayrshire and Toudern, this is of minor importance in comparison with the greater amount of milk given by the former. The greater amount of feed consumed by the Holland cows can be estimated, viz: Nine of them stood at one crib, while ten of the smaller stood at another of equal size; the fodder was, however, divided the same in each. The proportion is as nine to ten, or when the smaller cows eat 45 pounds of hay, the larger ones eat 50 pounds.

From the quantity of milk given, the Holland cows used a trifle over 5 pounds weight of hay to produce one quart of milk; Breitenburg used 6 25-100 pounds of hay; Toudern 7 pounds of hay; Ayrshire 9 pounds of hay. By these results it cannot remain doubtful which race is preferable.

XIV. Dutch Cattle an Artificial Breed.

It seems unfortunate that there should have been much feeling over the name of a breed of cattle, really the most wonderful as milkers of any known race. In the Eastern United States they are known as Dutch, Holstein, and Dutch-Friesian cattle. In the West they are almost universally known as Holstein cattle. The probability is that the name

Friesian is more nearly correct than any other. Nevertheless, the modern Dutch cow is as purely an artificially-bred animal as the Short-Horn, the Hereford or the Ayrshire. They have been bred and selected with scientific care so long that their character is constant and uniform in capabilities for milk, and they are bred to color almost purely at the whim of the breeder, one thing alone being constant. Where they are white they are pure white, and where black they are pure black, whether they be banded in color or spotted.

XV. The Earliest Importations.

It is more than probable that Dutch cattle were among the first imported to this continent, since the Dutch in their settlement of New York undoubtedly brought with them the best representatives of their breeds. It is recorded that in 1625 cattle were brought into the Dutch colony. These were undoubtedly the true Dutch cattle, since milk and labor were the two prime requisites with the colonists, and even so long ago as that date, the Dutch cattle united these points in a high degree. For as long ago as the early part of the seventeenth century (early in 1600) both Holland and England were noted for breeds of superior and deep-milking cattle. After these early importations of the Dutch and up to the early part of the present century there were probably no more Dutch cattle imported.

XVI. The Le Roy Importation.

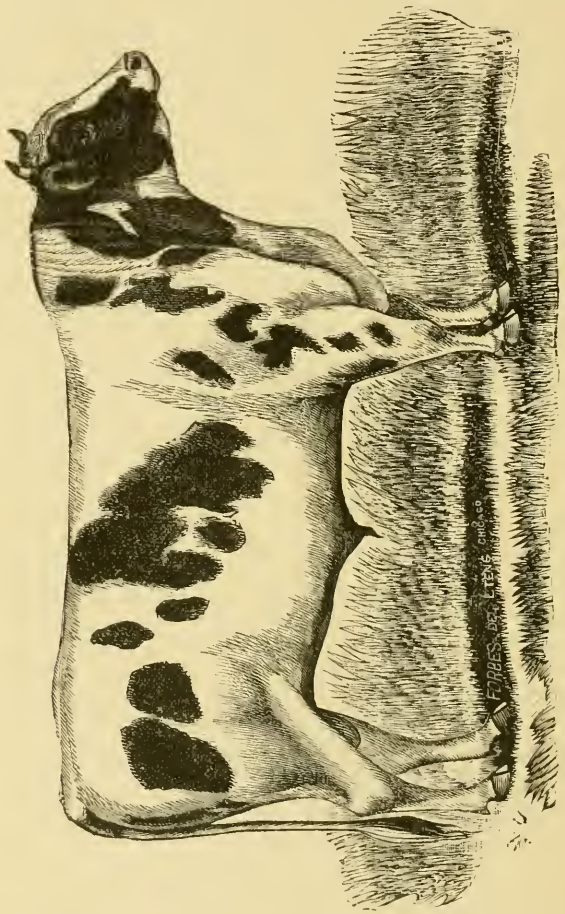
It is stated that somewhere between 1820 and 1825, Mr. Herman Le Roy, a public spirited merchant of New York city, imported some improved Dutch cattle which were sent to his farm near the city. Between 1827 and 1829, some of the produce of this herd were sent to the farm of his son, Edward Le Roy, on the Genesee river. Mr. L. F. Allen describes this herd in 1833, as he then saw them, as being large, well-spread cattle, black and white in color, and remarkable for their uncommon yield of milk, and of great value as dairy animals; their qualities in that line were universally acknowledged wherever known.

It seems unfortunate that the Le Roys, father and son, should not have retained their herd pure, but such seems to have been the fact, for it is known that at the sale of the farms of these gentlemen, none but grades were found in the herd or in the adjacent country.

XVII. The Chenery Importation.

According to the record it seems that the first imported animals tha have been retained pure, were those of Mr. W. C. Chenery, near Boston, in 1861. This was a bull and four cows, which were successfully bred and kept pure. Mr. Chenery, previous to that time, in 1852, imported

a single cow. In 1857 he made importations of a bull and two cows, and in 1859 a further importation of four more cows.



YOUNG HOLSTEIN BULL.

With this latter importation he was so unfortunate as to import pleuro-pneumonia. The ravages of this dread disease extended to the entire herd, and with the exception of a single young bull,

they were entirely destroyed. In 1861 Mr. Chenery made another importation of a bull and four cows, which came over sound. These and their descendants were the only pure-bred herd in America for years. That they were the best representatives of their breed is certain from the fact that they were selected with care from the best dairy herds of North Holland, and were so certified to by the official authorities of the districts where they were bred.

Later, as they gained a foothold in the West and showed their eminent adaptability to the climate, and their wonderful yields of milk became known, sagacious breeders undertook the importation as a business speculation. These cattle are now pretty well distributed from Ohio west, and, with full summer and winter feeding, are regarded by many dairymen, especially cheese-makers, as superior to any other known milking breed.

XVIII. What Prof. Roberts Says.

Prof. Roberts, in an address before the New York Dairyman's Association, gives the following in relation to breeding and care in North Holland and Friesland, from actual observation there:

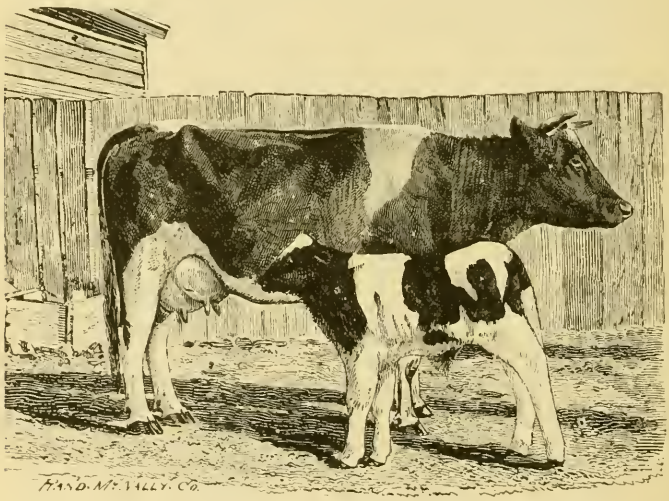
In the first place, but few bulls are kept, and these but for two or three years at most, when they are sold in the market for beef. These bulls are selected with the utmost care, invariably being the calves of the choicest milkers. But little attention is paid to fancy points or color, though dark spotted is preferred to light spotted, and more attention is now being paid to color in order to suit American customers. All other bull calves with scarce an exception are sold as veals, bringing about one and a half times as much as with us. In like manner the heifer calves are sold except about twenty per cent. which are also selected with care and raised on skimmed milk. The age of the cow is usually denoted by the number of her calves, and in no case did I find a cow that had had more than six calves, usually only four or five. Their rule is to breed so that the cow's first calf is dropped in the stable before the dam is two years old, in order that extra care and attention may be given. There are other objects gained by this method; for should the heifer fall below their high standard she goes to the butcher's market before another wintering, and though she brought little profit to the dairy she will more than pay for her keeping at the block. Here we find a three fold method of selection. First in the sire; second, in the young calf, judged largely by the milking qualities of the dam; and lastly is applied the greatest of all tests, performance at the pail; and not till she answers this satisfactorily is she accorded a permanent place in the dairy.

XIX. Measurements Adopted for Dutch Friesian Cattle.

The measurements adopted by the Dutch-Friesian Association of America in estimating value, with a view to tabulated records in future, including milk records, are as follows: 1—Length from point of shoulder to point of pelvis. 2—Length from forward point of hips to point of pelvis. 3—Width of hips. 4—Width at the thurl. 5—Height at shoulders. 6—Height at hips. 7—Girth at the smallest circumference immediately back of shoulders.

XX. How to Select Dairy Cows.

To sum up the whole matter of dairy breeds in a few words: If rich milk, without regard to quantity, is desired, select the little Jerseys.



HOLSTEIN COW AND CALF.

"Astrea 2d," the cow which took the Sweepstakes Prize at the Illinois State Fair last year. She is five years old, weighs about 1650 pounds, and is a good milker, giving from 56 to 64 pounds of milk per week.

They will certainly satisfy the most difficult to please. If both butter and milk are wanted, our preference would lie with the Ayrshires. But if great quantities of milk excellently adapted to the manufacture of cheese were the object, we should have no hesitation in saying, the Dutch cattle will quite fill the most sanguine expectations.

CHAPTER XII.

THE RAISING AND ECONOMICAL FEEDING OF CATTLE.

I. IMPORTANCE OF PROPER CARE WHILE YOUNG.——II. DIFFERENCE BETWEEN GOOD AND BAD CARE.——III. THE STARVED CALVES AT GRASS.——IV. THE OTHER SIDE.——V. GOOD WINTER KEEPING FOR CALVES.——VI. WHEN AND HOW TO CASTRATE.——VII. YOUNG BEEF.——VIII. HEAVY STEERS.——IX. FULL FEEDING AND EARLY MATURITY.——X. ECONOMY IN FEEDING.——XI. THE TRUE POLICY WITH YOUNG STOCK.——XII. FEEDING THE YOUNG CALVES.——XIII. FEED GRASS AND OATS EARLY.——XIV. WHERE THE PROFIT COMES IN.——XV. FEEDING FOR BEEF AND FOR LABOR.——XVI. REACHING RESULTS.——XVII. WHEN AND HOW TO FEED.——XVIII. OUT-DOOR FEEDING WHERE CORN IS CHEAP.——XIX. A GOOD CONDIMENT.——XX. SO-CALLED PERFECT FOODS.

I. Importance of Proper Care while Young.

There is no more important factor in the management of cattle than proper care while young. Those who imagine that they are doing the correct thing if they can manage to keep life in a calf until it is three months old, and then have it get fat on grass before winter comes, always have a set of "scrawns," with their digestive organs destroyed by improper food, and which never make either healthy steers or cows. They are always runts—contemptuously called "scalawags," by the butchers in our markets—and sell for one and a half to two cents a pound, when good cattle are worth from four and a half to six cents.

II. Difference between Good and Bad Care.

A single illustration will suffice. One man will give calves new milk until they are six weeks old, and then gradually reduce the quantity, substituting oat-meal porridge or fine corn-meal mush, with a very little linseed added, or mixing equal parts of oat-meal and corn-meal in the milk, until the calf is four months old. Then it will do well on soft grass and oats.

The other man takes the calf from the cow at one day old, and feeds it skim-milk until the age of three weeks, when half-cooked, coarse meal—husks and all—is mixed with the milk; and finally at six weeks or two months old, the calf is turned out to grass, receiving, perhaps, an occasional ration of sour whey. It is poor, does not grow, takes "the scours," which is only another name for indigestion, and if the animal gets through the first winter with what such a man calls special nursing, and occasional greasings with "anguintum," to kill lice, he finds himself the possessor of a scrubby yearling, ready (?) for grass, that will weigh, skin and bones, from seventy to ninety pounds.

III. The Starved Calves at Grass.

He expects his calves to get on their feed the next summer. Calves are endowed with great vitality, and if their stomachs recover something of tone, they will have shed their old hair, (what has not been eaten out by vermin) by the first of July, and by fall, if it be a good year for grass, they will be in half-decent store condition, and perhaps weigh 150 to 170 pounds each. That is, they will have gained from sixty to eighty pounds of flesh, each, to cover their bones. They are at the end of eighteen months, just where a good calf should have been at weaning time the fall

BADLY WINTERED.

WELL WINTERED.

before, but with constitutions ruined so far as profitable feeding is concerned.

Thus, this kind of feeding goes on; starved in winter and allowed to shift for themselves in summer, at the age of three years they will average 800 pounds, gross weight, if no epidemic seizes them.

IV. The Other Side.

The common-sense feeder keeps his calves growing right along, with plenty of new milk until their stomachs are capable of digesting solid food, when meal mush is added, and the cream taken from the milk. As soon as they will eat oats and grass, they are given as much of these as they want; and in the autumn, when ready for wintering, it would not be strange if they should average 200 pounds each.

V. Good Winter Keeping for Calves.

They are given warm shelter and the best and softest hay, with a generous allowance of meal daily. So they grow right along, and may be made to gain a hundred pounds during the winter. The next summer they are kept on flush pasture, or, if grass is bad, they get some corn, with plenty of pure water, and a place is provided where they may escape flies. Thus at three years old the steers are heavy beeves, and the heifers will have produced a fine calf, each, and be ready to do justice to them in the way of nourishment.

VI. When and How to Castrate.

Many persons put off gelding their calves until they are six months old, and often until they are a year old. This will do if "stags" are wanted; but stags, however fat, sell for one or two cents a pound less in the market than steers. The proper time to geld bull calves is not later than the age of four weeks.

When the calves are about three weeks old, drive them into a close pen. Secure a calf so it may stand at ease, but not struggle severely; or, it may be thrown on the left side for the operation.

Seize the scrotum with the left hand, and press the testicles rather firmly to the bottom; with a keen blade, rounded at the point, cut at a single stroke down through the scrotum and into the testicles, first one and then the other. Separate the membrane carefully, but quickly, when it unites, and draw out the testicles until about six inches of the cords are visible. Cut the cords, first one and then the other, with a pair of dull shears (this prevents much bleeding), and let them pass back. If severe bleeding ensues, inject a little muriate of iron into the cavity, and wet a soft rag with the same and pass it gently into the cavity. Some use salt and lard, but this is painful. So proceed until all are castrated, and then turn them into a place where strange cattle or flies will not molest them.

It is as little dangerous, this mode of castration, almost, as cutting one's finger. The parts should heal in a week. Castration often comes awkward to the beginner, but it soon becomes easy, if fearlessly and carefully practiced.

VII. Young Beef.

In England it has been the practice for years to force fattening animals from birth, so that they are heavy weights at eighteen months old, and fully ripe at three years old. Some results of this policy are recorded in the *Royal Agricultural Journal* of England. Among others Mr. Stanford, of Charlton Court, is credited with having sold high-grade Short-Horn heifers and steers in 1878 at ages and prices as follows:

	Price.	Return per month from birth.
One eleven-months-old steer	$ 74 00	$ 6 73
One thirteen-months-old steer	101 64	7 82
Three fourteen-months-old heifers, average	92 40	6 60
Three fifteen-months-old heifers, average	101 64	6 77
One sixteen-months-old steer	102 30	6 39
One eighteen-months-old steer	115 50	6 42
One eighteen-and-a-half-months-old steer	129 36	7 00
Two eighteen-and-a-half-months-old steers, average	122 10	6 60

The weights were not given, but the price is stated at from 16 to 18 cents per pound, net weight—meaning the four quarters. The best 16 months old steer must have weighed something like 1,200 lbs. alive, allowing the

quarters to have been 65 per cent. of the whole weight—a not very large allowance for such cattle. In the Chicago Fat Stock Show, the same year, the best steer, 28 months old, weighed 1,636 lbs. The best steer, one year old and under two 1,338 lbs., showing that our best feeders not only show fully as early maturity as English feeders, but likewise as wonderfully good weights.

VIII. Heavy Steers.

Until the inauguration of the annual Fat Stock Show in Chicago, under the auspices of the Illinois Board of Agriculture, at which cattle were shown for the best feeders and breeders in the West and South, but few reliable data as to the gain of animals in feeding could be gotten. At the time of the first show, in 1869, it was demonstrated that Western and Southern breeders perfectly understood the principles of fattening cattle, both young and old, and that they kept in view the fact that the young animal gains faster in proportion to the amount of food consumed than the mature animal, and the older and fatter the animal becomes, the less the daily gain. From the statements of exhibitors, sworn to in some of the more important classes shown there, and the reports of committee thereon, we quote:

Among the heavy cattle were the following, and credited to weigh, as taken from the pasture and feeding yards, as follows: The steer, Gov. Morton, 3,190 lbs; Burnside, 2,870; Hoosier Boy, 2,640; Nels. Morris, 2,840 pounds. The following are the actual weights as given by the committee, on animals 1 year to 4 years old:

Messrs. Graves & Co., one steer 4 years old, 2,445; one steer 3 years old, 2,060.

A. F. Moore, one steer 2 years old, 1,786.

J. D. Gillet, one steer 3 years old, 2,139.

Wing & Thompson, one steer 4 years old, 2,240; one steer 4 years old, 2,166; one cow, 1,525; one cow, 1,610.

John B. Sherman, one steer 3 years old, 2,019.

J. N. Brown's Sons, one steer 2 years old, 1,446; one steer 2 years old, 1,449; one steer 2 years old, 1,636; one steer 2 years old, 1,316; one steer 2 years old, 1,246; one steer 1 year old, 1,338; one steer 1 year old, 1,249; one steer 1 year old, 1,193.

Dexter Curtis, one cow, 1,833; one cow, 2,042; one cow, 1,936.

This record is specially valuable as showing the great weight attained by one, two and three-year-old steers, as well as the great ultimate weights attained by mature oxen, viz.; Best one-year-old, weight 1,338 pounds; best two-year-old, weight 1,786 pounds; best three-year-old, 2,139 pounds; and the heaviest 3,190 pounds.

In the foregoing we find a steer one year old and under two, weighing 1,193 pounds—as much as could be expected from a fairly-fattened four year old fed as the average farmer feeds. Does any one suppose the feeder spent as much on that yearling as the farmer ordinarily does on his four year olds?

IX. Full Feeding and Early Maturity.

By studying the foregoing it will be seen that the best gain was in the steer one year old and under two, the next best is a steer two years old and under three, and the third best gain is another steer two years old and under three. The four-year old steer made the least average gain, and the older the steer the less was the daily gain.

Every observing farmer knows that a calf allowed to run out during the winter and shift for himself with the other cattle, if fed on hay, with perhaps a nubbin of corn now and then, will weigh less in the spring than it did the fall before. And those who have tried both systems of feeding (full feeding from birth, with proper shelter, and allowing young stock only hay with such shelter as they may be able to find) know there is no profit in the latter, but absolute loss.

There are, indeed, places where hay may be had simply for the making, where the grazing is ample and where cattle may be raised at a minimum cost, if good shelter is provided. But year by year such sections are being more and more contracted, through the settlement of the country. As a rule, the best profits are now made by the seeding of meadows and pastures, by providing good shelter, and by the cultivation of corn enough to carry the stock in good condition through the winter. This is really the basis of profitable feeding in the West and South-west.

X. Economy in Feeding.

We have striven throughout this work to show that in the rearing of stock, the same strict attention to business principles should prevail that is necessary to success in any other calling. There must be a strict accounting of profit and loss, else no man can know, except in a haphazard way, whether he is making money or not. The feeder should know, in a general way, what food containing the elements of growth and possessing fattening qualities is cheapest. This, of course, will vary with different sections of the country.

An experience of forty years in the West has taught us to rely principally on corn for all kinds of stock. For cattle, when the price was forty cents a bushel or less, unground corn has been found the best; while for horses, sheep and swine, our experience has been that it does not pay to grind when the price is below sixty cents, for these animals masticate or

grind their food pretty thoroughly. For fattening cattle we prefer, first, shocked corn, next snapped corn—that is, corn snapped from the stalk with the husk remaining—and next, husked corn in the ear, the waste to be gathered by store hogs. We have found that, with good shelter, five pounds of corn and ten pounds of good sweet hay per day was a good fattening ration to each 1000 pounds weight of steers fed.

When feeding shock corn, give all the animals will eat clean as to the ears. They will take what blades are needed, and stock steers may follow to glean, with stock hogs after, to pick up what grain is wasted or left in the droppings. Sheltered from winds and storms the stock may thus be economically fed to heavy weights.

For young and growing cattle there is nothing better than equal weights of corn and oats, or corn and barley ground together, whichever may be cheapest, with plenty of good hay or corn fodder that has been shocked before frost. In the South cotton-seed meal, and mill stuff may take the place of corn and oats, or corn and barley, while pea vines, or other good fodder natural to the climate, may be used instead of hay. The economy of feeding, may thus be summed up: First, good shelter; second, plenty of food to keep the animals constantly improving, and third, feed whatever substantial and nutritious food may be cheapest.

XI. The True Policy with Young Stock.

We may be allowed to repeat nearly verbatim what we have before written upon the subject of raising young cattle. The breeder and feeder must exercise sound and careful judgment. It will not pay to starve even the commonest stock. A calf, to use a common expression, "knocked in the head with a pail of skimmed milk," will never make a first class steer or cow. Neither is it necessary that they suck the cow. In fact, in the case of the dairy cows or heifers intended for the dairy, they should not suck, for it surely tends to diminish the flow of milk, except the calf is turned with the cow at stated intervals, and the cow milked clean at the same time. In the case of heifers, they should be milked as soon as the calf has drawn the first milk, both as a means of training and to develop the flow of milk as much as possible; besides this, a calf taken at two or three days old is easily taught to suck the finger or an artificial teat attached to a reservoir.

XII. Feeding the Young Calves.

For the first two or three weeks they should have nothing but new milk. It should be as warm as it comes from the cow, and the calf should be fed four times a day. Then they may have milk twelve hours

old, from which the cream has been taken, adding four ounces of finely ground meal made into thoroughly cooked mush, to each meal, for strong, hearty calves. Thus they may be fed for two weeks more, changing to oat-meal or wheat flour if the calf is inclined to scour. Some feeders add a teaspoonful of linseed meal once a day; it is not a bad plan. When the calf is four weeks old it need be fed but twice a day, giving milk warmed to about ninety or ninety-five degrees, which last is the natural animal heat. From this time on, more and more mush, or its equivalent, may be added as the calf increases in size and strength, until it begins to eat grass and threshed oats, which it should be encouraged to do.

XIII. Feed Grass and Oats Early.

At ten weeks old the calf should eat freely, and at three months old it may be gradually weaned from milk and taught to subsist on grass and oats. During all this time the calf should be sheltered from the hot sun and rain, by providing a shelter to which it may retire, well ventilated, dry and clean, and sufficiently dark to keep out green-head and other biting flies. In the autumn its rations of grain should be increased, and as grass fails the finest meadow hay should be substituted—whatever it will eat clean of both. Offer it water occasionally after it is a month old, and when weaned see that it never lacks for water.

XIV. Where the Profit Comes In.

If during the winter you have kept the calves in the warmest quarters possible, and fed liberally with grain and hay, in the spring you will have received the best profit that you will ever reap from the animal at any subsequent age; but upon comparing debit and credit with your neighbor who has fed skim-milk alone in summer and poor hay in winter, you will find that the loss on his calves has gone in the shape of profit in yours.

From this time on feed liberally of grain in the winter, and give a little all summer when they will eat it. Let them be so warm in winter that they never become chilled. So continue until the animal is within six months of being ripe for the butcher. Then feed the best you can, and you will find that you will get two to three cents a pound, gross weight, more than your neighbor who has only half fed and has turned off his cattle totally unfit for the butcher.

The same rule will hold good for those calves intended for cows. To make a good cow, she must be fed well to bring early development and maturity. She may thus be brought forward strong and lusty, and in better condition at two years past to bring you a perfect calf, than those of your neighbor at twice that age, whose policy has been to grudge them feed and allow them to shift for themselves.

XV. Feeding for Beef and for Labor.

The following, originally written for the American Encyclopædia of Agriculture, contains in the extracts given the gist of our conclusions on the subject of feeding:

The time is long since passed when it is considered true economy to allow young stock to shift for themselves without the intelligent care of the master and proper feeding. The most successful feeders of to-day feed all stock liberally, and such as are destined for human food, are fed fully from birth, and until ready for the butcher's block. But the system of forcing is carefully avoided with all stock intended for either labor or breeding. The object here is to develop strong constitutions and ample bone and muscle, that a long and useful life may result. Hence a different class of foods are used from those intended for mere fattening. In this, again, the question of the proper foods to be used becomes important.

XVI. Reaching Results.

The food must be perfect food; that is, adapted to the special requirements of the animal. Young animals; those required for labor; those to be used for fast driving, and those ready for feeding ripe (fully fat) each require different food, and, indeed, different care.

In the fattening of animals, the sooner they can be brought up to a fully fat weight, the greater will be the profit; a weight of, say 1,500 pounds for cattle, 300 pounds for the large breeds of swine, 200 pounds for the small breeds, and from 100 to 150 pounds for sheep, according to the breed. To do this they must be pressed forward from birth, by means of the food best adapted to the animal, and marketed before they become fully grown. In summer a pasture containing a variety of good grasses will furnish this perfect food. If anything is needed more, it may measurably be found, for fattening, in Indian corn, or meal as a supplementary food, to be given at night.

For young animals, working and fast driving stock, oats are proper. The two first, however, may have any kind of mill stuff, with profit, if cheaper than oats. In the winter all stock, in addition to good, sweet hay, should receive daily such grain as will best answer the end, except that corn meal, or corn, may constitute a part of the daily ration for all classes of stock, since more fat is required for the animal waste than in summer.

For dairy stock the young animals should be fed identically as for working stock, but not forced, since sufficient frame-work for continued usefulness must be provided. Milking stock may receive largely of corn meal, in winter, and ground rye, oats, barley, or mill feed, according to relative prices.

Another important matter is the necessity of changing their diet. Animals will live on one particular food. They will even thrive for a time; but the best results, economically considered, have always been gained by varying the food, according to the appetite of the animal. The change from green to dry, and dry to green food, however, should not be made too suddenly.

XVII. When and How to Feed.

Hay, in the West, is one of the most expensive of the stock foods raised in all that great region known as the corn belt. In the more central portions of the corn zone, a ton of corn and fodder can be produced for less money than a ton of the best meadow hay. Hence, feeders use as largely of corn as possible, and when finishing off cattle fat, it is given almost exclusively, or with only enough rough fodder to properly divide it. Regularity in the amount of the ration fed is of particular importance. All animals should be fed at exactly regular hours, and just what they will eat clean. If any is left, it should be removed and given to other hungrier animals. As to the time of feeding, three times a day is sufficient for all except horses and swine. In fattening swine the best results are obtained by giving them what they will eat clean four times a day. There will always be some animals that will be delicate and indifferent feeders. These should always be separated from the hearty ones and given special care and food. Get rid of them at the first possible opportunity; certainly as soon as they are in passably salable condition. There is no money either in trying to raise or fatten such.

When cattle are kept in a stable there should be a room, frost proof, where the morning's food may be prepared over night, if mixed food or wet food is given. If meal or other grain food is given without mixing with hay or straw—and in our opinion this is better for cattle—it should be given only moist enough so it will not be dry. A little experience will soon enable the feeder to so prepare the meal for the whole stock over night, that it will be in proper condition in the morning. If it be mixed with cut food, use clear bright oat straw if possible, and not cut shorter than two inches.

XVIII. Out-Door Feeding where Corn is Cheap.

In the milder latitudes of the West it has been found economical to feed in the open air where the shelter of timber or artificial plantings may be had. Careful experiments made some years since at the Illinois Industrial University, as between feeding in stables with ground and unground corn, showed a decided profit in the latter way of feeding. This we have also found to be the case. Under this system of feeding, whether the stock are fed snapped corn, or fed with husked corn, very little is lost.

The cattle are fed plentifully. What they leave and that which passes undigested is picked up by swine, two hogs being usually allowed to each steer to be fattened, and at the end of the day the hogs are given some corn additional, if they need it. Thus, except in very inclement weather, steers may be made fat on about fifty bushels of corn in about three to four months' feeding, and the shoats require but little additional food to bring them up to heavy weights.

The best plan we have ever tried for out-door fattening is to feed corn cut at the roots and shocked. This is hauled daily on truck wagons, when the ground is hard, or on sleds when there is snow, and fed, corn and fodder together. The cattle are not expected to eat the fodder clean, but usually they may be expected to consume the blades, which with the ears are the valuable part. The feeding is twice a day, in feeding lots—a lot for the morning feed and one for the evening feed. The cattle being about done with the ears, hogs are turned in to glean the scattered corn and droppings. Thus, whatever the system of feeding, if cattle have shelter from stormy and inclement weather, they may be made very fat, and healthfully so, and, where labor is scarce and corn cheap, at a minimum expense.

XIX. A Good Condiment.

We do not believe in condimental food for animals as a rule, but when it is deemed necessary, the following will be found to be a good condiment for special feeding, to be given one pound with each feed of meal: Twenty-five pounds ground linseed oil cake, ten pounds ground flaxseed, forty pounds corn-meal, twenty-four ounces ground turmeric root, two ounces ginger, two ounces caraway seed, eight ounces gentian, two ounces cream of tartar, one pound sulphur, one pound common salt and ten ounces coriander seed. Mix the whole together, and when fed use a quarter of a pound of molasses to each feed, the molasses to be used in the water for wetting the food in which the condiment is given. Where sorghum molasses is made, this will not be found to be expensive.

XX. So-Called Perfect Foods.

So much has been said by theorists about perfect foods, and the danger from feeding corn, that many persons have been brought to believe that corn is almost a dangerous food for growing animals; that thus fed, they will lack bone and muscle, and cannot be expected to grow up healthy. If an animal were to be raised exclusively on corn this might be true, but the same would be true of other grain. Neither horses, cattle, nor sheep can be properly raised exclusively on grain. Oats are

undoubtedly the best grain that can be fed to growing stock in connection with hay. Oats, however, cannot be afforded. Good hay is a perfect food, so far as the distension of the stomach is concerned. The animal cannot eat enough to fatten upon. Our pastures make a perfect food, so far as muscular development is concerned. For cattle, whole corn, that is, ears, husks, and leaves, forms a perfect food either for growing or fattening stock in winter, so soon as they get strength of jaw sufficient to crush the corn. Therefore, no breeder need be afraid that cattle from calfhood up will fail to develop, with plenty of good hay and corn, or corn-meal in winter, and plenty of good, flush pasture in summer, with pure water at all times.

CHAPTER XIII.

PASTURAGE AND FEEDING FOR PROFIT.

I. STUDY THE CONDITIONS.——II. PROVIDE AGAINST DROUGHTS.——III. KINDS OF FEED TO RAISE.——IV. PASTURE THE POOR MAN'S WEALTH.——V. THE VALUABLE CLOVERS.——VI. ALFALFA OR LUZERNE.——VII. CLOVERS NOT GENERALLY VALUABLE.——VIII. FORAGE AND FEEDING PLANTS.——IX. GRASS IS THE MOST VALUABLE.——X. GRASSES OF SPECIAL VALUE.——XI. THE COMING GRASSES FOR THE WEST.——XII. THE TIME TO PASTURE.——XIII. FEEDING IN WINTER.——XIV. WATERING.——XV. FEEDING IN SUMMER.——XVI. ECONOMY OF FULL SUMMER AND WINTER FEEDING.——XVII. SUMMING UP.——XVIII. FINISHING A STEER.——XIX. WHEN TO SELL.

I. Study the Conditions.

In every country, and, indeed, in every district of a country, the circumstances attending the rearing, and especially the feeding and fattening of stock are so varying and diversified, that the aggregate cost of a comparatively insignificant group of items is what makes the difference between profit and loss in feeding. For instance, a few cents a bushel more or less in the price of corn, an extra month of winter, or greater cost of watering in one case than in another may give one man profit and another man it may carry into loss. Insufficient shelter, imperfect conveniences and little wastes, here and there will often turn the scale both in summer and in winter feeding.

II. Provide against Droughts.

In summer, a drought which finds the feeder unprepared with green food, other than grass, will destroy profits, as also will a failure of water. The reason is simple. Every case of this kind which stops or retards fattening, is not only a loss through the shrinkage of flesh, but after the animals again begin to improve, it takes some time before they really begin to thrive again when the pastures become flush. Not so with the farmer who provides against a lack of water during droughts, and has sufficient green fodder to supply deficiencies arising from bare or partly bare pastures.

III. Kinds of Feed to Raise.

The question of feeding-material is an important one, and here the feeder must be guided by soil, climate and such other natural contingencies as he may have to encounter. Any fodder crop does best on a rather

porous but rich soil. Hence, if the soil is stiff, it may be opened by plowing under long manure deeply. If already too light, give it cow manure, ashes, and such special manures as you may be in the habit of using.

Corn is the great soiling crop for farm animals North and South. Next come sorghum, and the many varieties of Doura corn or East Indian millet. In the South, cow-peas are valuable. Alfalfa, once it is established, gives heavy cuttings of fodder. In the North this plant has not, as a rule, proved valuable, but some varieties of the cow-pea can be grown and matured in from seven to eight weeks. It is worthy of experiment. Sown after the nights become warm, this crop is a most valuable one to turn under as a fertilizer if not wanted for feeding.

With proper care in seeding thick on rich soil, any forage crop may be cut with a mowing machine, so that the labor of gathering is comparatively light, and it may be fed occasionally in the field or in the yards, night and morning, or only at night, as circumstances may dictate.

It must be remembered as a first principle in feeding, whether for growth or for fattening, that animals must not be allowed to shrink, since every time they do so it is at a loss of flesh to themselves and of profit to the owner.

IV. Pasture the Poor Man's Wealth.

Upon plenty of good pasture depends success in summer feeding; with the majority of farmers the pasture provides the sole summer feed. Hence the necessity that it be strong and vigorous. Nothing is gained by overstocking a pasture. It is better to get rid of some of the stock than to feed the pasture too close, for animals that have to busy themselves all day to satisfy the cravings of their stomachs never come out fat. If you have provided for contingencies, by means of fodder, you may, of course, stock your pastures closer than otherwise. If not, stock them only so the cattle can easily supply their wants.

V. The Valuable Clovers.

The best clovers, or those which do well generally, are practically included in three species, viz: The Red clover, the White or Dutch clover, and the Alsike clover. The soils best adapted to Red clover are such as will bring good crops of winter grain, though Red clover does well on all soils which do not heave badly in winter.

White clover will grow on any land adapted to Blue grass, and also on many rather moist soils. It favors a firm, not a spongy soil. It must be confessed that cattle do not like it, but it makes rich feed, and if mixed with Blue grass, or other soft grass, cattle will take both together.

Alsike clover—often called Swedish clover—does well on most soils, and will bear considerable flooding, if the flooding is not too long continued. We consider it as altogether superior to White clover for pasture, and on soils too wet for Red clover it makes good hay for cattle.

VI. Alfalfa or Luzerne.

Alfalfa or Luzerne—its true name—is a valuable barn forage; it should be cut and fed fresh or partly wilted. It thrives on deep, dry soils, which are not subject to hard freezing in winter. It has become thoroughly naturalized in California, and would probably do well on the Western plains in Texas and in New Mexico, as it has done in some of the Southern States east of the Mississippi.

VII. Clovers Not Generally Valuable.

What we have previously written under this head, we have since seen no reason to change. There are many other species of clovers, some of them indigenous to the West, which we only mention as a caution against their being sown. These two species of so called Buffalo clover—the upright and the running Buffalo clovers—the upright or yellow clover, and the low hop clover, a half-creeping variety. There is only one more variety worth mentioning, and this simply as a warning to farmers not to sow it, except for bee pasturage, and then only when it may not become a troublesome weed. We have reference to the tree clover or Bokhara clover, specifically the white-flowered melliotus. It has been recommended as valuable for soiling, that is, for cutting green for feeding to stock in stables. We give the same advice about sowing this clover that the crabbed lawyer did to a young client who asked his advice about getting married—*Don't*.

If there are bee men near, your hedge rows and waste places will be well seeded with this Bokhara clover. At least such seems to be the case, much to the disgust of the general farming community. It does make good bee pasture—no doubt of it—but it is a nuisance in every other respect.

VIII. Forage and Feeding Plants.

We have already spoken of the value of forage plants, and, in a preceding chapter of root crops. Turnips, rape and mustard, so valuable in England and some other parts of Europe, belong to what botanists call cruciforous plants. The ruta-baga, the kohl-rabi and the cabbage are the principal plants of this tribe that are valuable to the farmers in the United States; and, in the West, these are not especially valuable for feeding. Of the other special fruit and root crops, the gourd family includes

pumpkins and squashes, which find a large place in feeding stock in many portions of the United States. The composite family, the largest of the natural families, furnishes artichokes and a few others seldom used; but it is remarkable in its lack of useful species although wonderful in ornamental ones. The night-shade family gives us the potato. The parsley family gives us the carrot, the parsnip and some others of value, and the goosefoot family furnishes the sugar beet and mangelwurzel, valuable for feeding in the West.

IX. Grass is the Most Valuable.

All these plants placed together are of minor account in comparison with the great grass family, which includes our cereal grains.

We do not use botanical names usually in speaking of grasses. We only introduce them below in connection with the common names, because in some cases the same grass goes by different names in different parts of the country. The feeder may select from the following list:

Timothy, (*Phleum pratense*) a better name for which would be Cat's-tail grass, and, for the reason that in some sections of the country it is called Timothy, as in Pennsylvania, and Herd's grass in New England and New York. Neither of these names gives an indication of its characteristic flower-head, while the former names do. In Blue grass, (*Poa pratensis*); Wire grass, (*Poa compressa*); Red-top, (*Agrostis vulgaris*) confusion of names again comes in. In Pennsylvania, Blue grass is called Green grass, and Red-top is called Herd's grass. Orchard grass, (*Dactylis glomerata*); Fowl-meadow grass, (*Poa serotina*), and Meadow fescue, (*Festuca pratensis*), are also most valuable grasses.

X. Grasses of Special Value.

For feeding during droughts, Indian corn, sown at the rate of two bushels per acre, in drills two feet apart, cultivated thoroughly once or twice, and cut when in blossom will make a good reliance, as also will German millet (*Panicum Germanicum*), and common millet (*P. miliaceum*). Here we have nine varieties of grass that do well generally.

The first, second, third and fourth, with the clovers heretofore named, constitute the bulk of the grasses cultivated for pasture. Orchard grass is one of the most valuable in the whole list, and should be tried everywhere, on land not wet. Fowl-meadow is also well worthy of trial. Fowl-meadow grass especially has been found to take the place of Blue grass in those sections of the Northwest where Blue grass does not succeed. Especially has this been the case in Wisconsin. It is hoped it may be found so in the Southwest, where Blue grass is not natural to the soil.

XI. The Coming Grasses for the West.

We believe Orchard grass and Fowl-meadow will be found to be two of the most valuable grasses for the West, the Northwest, and perhaps for the Southwest, when they come to be better known. Orchard grass, also, gives good satisfaction in the middle region of the South, and we think that Fowl-meadow will also prove most valuable there. Mr. Frank E. Hoyt, a careful farmer of Wisconsin, in relation to this grass, says he knows of no grass in the Northwest that will compare with it, either for pasturage or the production of hay. It has never been winter or summer killed, and he has found one acre of marsh well set in Fowl-meadow equal for pasturage to three acres of upland, set in Blue grass, and the hay produced the second year after seeding has never failed to pay the entire expense of cultivating and seeding the land. Fowl-meadow hay is especially valuable for horses, having all the advantages of wild hay, being free from dust, that infests timothy and clover, while it possesses all the nutriment of the best tame hay; and those dairymen who are acquainted with it, pronounce it valuable hay for milch cows.

XII. Time to Pasture.

The time to pasture is when the dew is on, the earlier in the morning the better. Our plan has always been to allow cattle to lie in the pasture all night; and this rule is good even in the spring and fall, if shelter is provided against cold storms, and the pasture is not too remote from the house. In that case the milch cows must lie in the yard, but should have some food they like, early in the morning, unless milked at day-break.

XIII. Feeding in Winter.

Whatever the stock, or the place of feeding, give the first meal as soon after day-light as possible in winter—just what they will fully eat. If eaten pretty clean, give a little more feed again at noon, and again at night, so that the animals may lie down on fairly full stomachs before dark. If only one feed of grain is given daily, it should be given at night.

Stock should be graded in the feeding yard as to age and strength. The weak and the strong should never be fed together, else the strong will get better feeding than the weak ones, even when the fullest allowance is given. Special attention should be paid to the allowance of salt. Cattle should have it where they can take it at will. They will consume less than if it be given them at regular intervals. Salt taken in large doses is cathartic, but in such quantities as animals naturally crave daily it aids digestion and is necessary to all herbiverous animals.

In feeding in stables observe the same rule—full feeding of good provender, early and late and at noon. This is what keeps animals growing continuously and insures profits; for thus the feeder secures the greatest possible gain, with the least loss, to the animal system.

It is poor policy, when grain is cheaper than hay—and it is so in many portions of the West—to feed largely with hay. Corn and good bright straw, with, say, five pounds of good hay daily per steer will keep them growing right along. Dry corn with little fodder tends to unnatural heat and fever. Therefore keep the stomach distended with a proper quantity of fodder of some kind, and if the corn can be fed after being soaked so much the better.

XIV. Watering.

Cattle should have water offered them twice a day in winter, and in summer it is desirable that they get it whenever they happen to want it. People sometimes need but little water and at other times a great deal. It is the same with stock of all kinds. If the water is in pools, do not cut holes in the ice for stock to drink through, unless precautions have been taken to prevent their slipping on the ice. This hint may seem needless; and yet, there is more loss on stock, every year, from this cause, than would provide suitable pumps and troughs, and also pay for the labor of pumping.

XV. Feeding in Summer.

In fattening cattle it often happens that the grass is not sufficient, or if it be sufficient to keep them full, they do not fatten fast enough. It is just as cheap for the farmer who only fattens a few head yearly to make prime cattle, as it is for one who fattens hundreds. In fact a man who fattens but a few head should make better cattle than one who feeds many.

In England when grain is high, the most of it being imported, summer feeding of grain with grass has been practiced for years. Why should it not be so here in the West, where the grain is grown that the English feeders buy? The pastures during July and August will not graze as many head of cattle as in spring and autumn. Hence, the English farmers can fully stock their pastures by supplying what meal the cattle will eat while the grass is scant. When pastures are flush and in full succulence but little if any of the meal will be taken. What meal they do eat is so much clear gain in fattening. Animals, when on succulent pasture, require some dry food. They will even eat a little hay daily at such times. Thus meal, or if the cattle are used to it, soaked corn, not only modifies the succulence of green grass and clover, which contains

from eighty to eighty-five per cent. of water, but it promotes the growth of young cattle, and brings well-matured steers fully fat at midsummer, and at other seasons when prime beef brings the best prices.

XVI. Economy of Full Summer and Winter Feeding.

From what has been written the reader will have become convinced that we believe in the economy of full summer and winter feeding, and this from calfhood up until the animal is sold to the butcher. The same rule will apply to stock intended for breeding and also to cows raised for their milk product. In the two latter cases, however, the feeding must be more diversified; for breeding and milking animals need to have fully-developed frames. This is not so necessary for stock that is to be sold as soon as fit for the butcher. We have shown that three years from birth is ample time in which to prepare cattle for the butcher's block. The principal economy in feeding grain to fattening animals the year round is, that thereby your pastures may be more fully stocked than otherwise, and thus may be fed more evenly. By this course, also, you will have more land left for the production of corn for winter feeding. We have cultivated over sixty acres of corn to the hand in a field of 1,500 acres, the outlay being only one-third of a day's work per man per acre up to, but not including, the labor of husking. The average yield was within a fraction of forty bushels per acre for the whole area, and the final result was of corn put into the crib, over seventeen bushels for every day's work of each hand employed. The same may be done by any farmer on measurably clear land in any season.

The first proposition in relation to full feeding, winter and summer, is, that your pastures will thereby carry more cattle. The second is, that animals, going into winter quarters fat, will waste less flesh during the winter, since the animal heat is more easily kept up in a fat than in a half-fat or lean one. The third and not the least important point is, that you hasten maturity and thus save interest on capital, insurance, and other items of cost.

XVII. Summing Up.

The whole matter may be summed up as follows: The pasture grasses mixed make a perfect food. Therefore make the most of them. Clover, Timothy, Red-top, Orchard grass, and Fowl-meadow grass also make a perfect food. When they can be economically raised (and where in a grass country can they not?) make the most of them. Raise all the roots you can, (in the West carrots and beets) to supplement your grasses with. But do not expect to fatten stock without grain. It cannot be done unless extra warmth is provided, and this is not economical. Never

attempt to fatten stock of any kind without due attention to comfortable shelter. For this, expensive structures are not necessary. We have fattened cattle in a structure of posts and poles covered with hay and embanked at the sides, and with no flooring but the natural earth, but with a thick bedding of straw. Yet, if the means of the farmer will allow, a good frame structure will pay, simply in the lessened cost of labor in care, feeding and cleaning. Once you begin to fatten, never allow the stock to lose, but keep them going right along, and increase the richness of the food as the animal progresses to ripeness.

Hay will bring a steer into tolerable condition for fattening. Then he will stop. Good pasture will carry him still farther. He will make good, succulent, healthy beef, but cannot be made fully fat on grass. Hence, he must at least be finished off with grain. Indeed, to make him "ripe" (fully fat) meal and even oil-cake must be used.

XVIII. Finishing a Steer.

If the steer has been liberally fed from a calf, he will be ready to begin fattening the spring he is three or four years old, according to the breed —if a Short-Horn or Hereford, at two years old perhaps. Turn him on pasture and add what soaked corn or meal he will eat; give him shelter from the heat and flies. If the aftermath is good add pumpkins, or corn in the husk, as soon as it begins to glaze; and continue increasing the corn as the grass fails.

Do not let your steers suffer for want of shelter from storms, and when the grass gives out put them in a warm stable, and finish them with meal, or meal and oil-cake, allowing of the best hay not over ten pounds a day, with a peck, daily, of roots or the equivalent in pumpkins, as long as they last. If the steers are to be continued in the fields—where the climate and shelter will admit—feed shocked corn, and let store cattle and hogs consume the leavings. Thus you may always have them in condition to sell when the price suits.

XIX. When to Sell.

Sell in the fall or early winter if the demand will warrant it. If not, keep the steers until the price coincides with your views. Your books should tell you just how much your cattle have cost, and just what the profits would be at any time, if you weigh them on your home scales, or those nearest you; you will have cattle that buyers will always come to you for in either case. And if they are stall-fed—as we have shown how to stall-feed—they will always bring the price of fancy beef; and two to three cents advance over the price of half-fattened beef is just where the profit of feeding lies.

CHAPTER XIV.

HERDING AND GRAZING.

I. GREAT HERDS OF THE SOUTHWEST.——II. LOSSES FROM COLD AND NEGLECT.——III.——CATTLE DO NOT WANDER FAR.——IV. THREE THINGS NECESSARY IN HERDING.——V. HOW TO RAISE WATER.——VI. TANKS AND POOLS FOR STOCK.——VII. HAVE THE POOL DEEP.——VIII. PROTECTION AGAINST STORMS.

I. Great Herds of the Southwest.

In the United States the capital invested in cattle not confined within the boundaries of farms, but which are herded summer and winter, is enormous. Ten years ago the herds of Texas and New Mexico numbered over 4,000,000 head, or about one tenth of all the cattle of the Union. These gaunt, bony, long-horned, half-wild descendants of the original Spanish cattle were ever impatient of restraint, not easily confined within enclosures and at an early date overran all the fertile but dry region of Texas and New Mexico, and even became acclimated in Southern Kansas and the Indian Territory.

Immense droves of them were driven North into Kansas, where they were herded during summer, and thence were carried into Missouri, Illinois and Iowa and eastward, to be fattened in winter, or else sold directly from the grass to the butchers. Still later, the vast herding grounds of Colorado, Montana and Wyoming have been occupied by similar cattle and by their descendants, crossed with improved bulls of Short-Horn or Hereford stock. Much attention has also been given to the acclimating of well-bred northern cattle in Texas for improving them. In California also, there were originally great herds of these Spanish cattle, but more lately they have been nearly or quite supplanted in that State by improved stock.

II. Losses from Cold and Neglect.

Little or no efforts were made to provide food for these half-wild herds in winter, and hence great numbers often died in Texas, New Mexico, California and the Indian country from lack of feeding, and also from the deep snows and severe weather encountered when they were taken into the more northern plains country. A little forethought in providing some sort of shelter, and putting up hay for feeding during storms, might

have prevented this, but the pioneer is too often improvident, and hence the immense losses suffered by the herds in bad seasons, especially in the winter of 1880-81.

III. Cattle Do Not Wander Far.

Cattle, unlike their relatives the Buffaloes or half-wild horses, do not wander far from their native feeding grounds. Horses will make long journeys in search of food and water, and Buffaloes yearly make long migrations, extending from the Southwestern plains well up into the British possessions. It is not so with cattle. In times of great drought they perish if not relieved by man, and if from any untoward cause their feed fails in their immediate range, they will not make long journeys in search of it. Their only migration is that gradual one which year by year, from increase of numbers, pushes herds further and further from their native feeding grounds.

IV. Three Things Necessary in Herding.

Since the Indians have been pretty generally confined to reservations, the danger from loss of cattle from their depredation upon herds has been nearly extinguished. The three principal requisites for perfect herding now are free access to water, plenty of range contiguous to the water, and proper provisions for feeding in winter during prolonged droughts or periodical storms. The great herding ranges of the Rocky Mountains, and of Texas and the plains, can only be made available where they are traversed by running streams, since the plan of getting water by means of artesian wells, once thought to be feasible, has not generally realized expectation.

Many portions of the great Southwestern plains regions are also sparsely cut by living streams, and much of the country is arid and subject to extreme droughts. Hence, although some artesian water has been found, by boring under Government supervision, and occasionally by private enterprise, the probabilities now seem to be that only the region contiguous to natural water can be permanently occupied, and thus the cattle range cannot extend more than about five miles from permanent streams, except where the deficiency may be supplied from wells.

V. How to Raise Water.

Wherever water can be found within twenty-five feet of the surface, it may be easily raised by means of the modern windmill, and the ordinary lift-pump. If the water lies further from the surface, the question becomes more serious, and a force-pump must be used. As the depth increases the difficulty increases, so it may be considered impracticable to raise water on the plains for a large herd of cattle without the aid of

steam. Hence in regions where no fuel is to be found in a week's travel many of our otherwise good grazing grounds remain unutilized.

VI. Tanks and Pools for Stock.

The water when once pumped may easily be saved for use, by digging deep tanks or pools in the ground and thoroughly puddling and grouting the bottom; or, in the case of a porous soil, the pools must be prevented from leaking by a layer of clay eighteen inches or two feet thick on the bottom, well tramped by cattle while quite soft with water. This grouting of clay must, of course, extend some distance above the intended water line at the top, and the reservoir should not be less than six or eight feet deep, to prevent undue loss by evaporation.

Another important point is that trees must never be planted about the pool, for the roots will surely find their way to the water, and thus furnish the means of leakage through the grouting.

VII. Have the Pool deep.

The importance of having the pool deep cannot be overestimated. A shallow pool will quickly evaporate under a hot sun, but not so the deep pool. There are two reasons for this. In the first place, a pool, say six feet deep will hold six times as much water as the pool only one foot deep; and at the same time the evaporation from the deep pool will be less than that from the shallow one, since the water in the former always remains much colder, and will never become so strongly heated by the sun. Another advantage is that the deep pool does not so readily breed germs dangerous to the health of the cattle.

A deep pool, as described, may quickly be scraped out by means of teams, and the earth used as an embankment. Thus, an oblong pool, say thirty feet wide by three hundred feet long, will hold an immense quantity of water, and allow of the drinking at one and the same time a great number of cattle. If advantage is taken of some place where water flows, even temporarily, after rains or during thaws, a dam thrown across one end, above the pool, may furnish a reservoir, to fill the pool and keep it gradually supplied, except in cases of extreme drought.

VIII. Protection against Storms.

Severe storms must be provided against, for in the great herding grounds of the West they are sometimes very destructive. Where there are gulches they may be taken advantage of for shelter. Where there are no gulches the best protected locality must be sought, and this should be further protected by planting timber adapted to the soil. If the soil is dry, yellow pine and Norway spruce are the trees to plant, but the

belts of the trees must be protected from the cattle. Where there is sufficient moisture for grass, cottonwood will generally grow if protected for a few years. The catalpa (*Speciosa*, not *Bignonioides*) would be most valuable. It is hardy, grows fast and is less injured, when of some size, by the tramping of cattle, than are most trees.

If the cattle kings, who have acquired great wealth by herding in Colorado and the territories, had attended to this matter, and to the providing of fodder for use during storms, it would have saved them heavy losses, not only from storms, but from the stampeding of their herds. The cattle would be practically safe from stampeding when in the timber, and even when stampeded on the range they would instinctively seek this shelter if once turned towards it.

CHAPTER XV.

THE HUMANE MANAGEMENT AND CARE OF CATTLE.

I. A MERCIFUL MAN IS MERCIFUL TO HIS BEAST. — II. WHAT CONSTITUTES GOOD CARE AND KINDNESS. — III. HOW TO MANAGE A KICKER. — IV. TO PREVENT SUCKING. — V. DEVICES TO PREVENT GORING. — VI. DRIVING TO AND FROM PASTURE. — VII. AMENITIES OF THE BARN YARD. — VIII. AS BETWEEN GOOD AND BAD MANAGEMENT. — IX. ASSIMILATION OF FOOD. — X. TWO WAYS OF LOOKING AT IT. — XI. THE PROFITS OF HUMANE TREATMENT.

I. A Merciful Man is Merciful to his Beast.

No argument should be needed to show that in the management of animals good care is good policy, or that in kindness to them there is money as well as mercy. Examples of both methods of dealing with farm animals can be seen in every day life in the yards and pastures of the farms we pass on any country road. When the stock is managed by blows and main force, the animals are wild, vicious and unmanageable both in the yard and the pasture. They regard every visitor with suspicion, and are ready to take to flight at the least sign of danger, or they raise their heads and snort at every noise. If cornered they will either fight, or else seek to rush over or around the supposed source of danger, however trifling it may be. On the other hand, when the cattle are kindly cared for, they take no notice of anything but their own individual wants, and are ever ready to seek and enjoy the kind word or caress they are accustomed to receive.

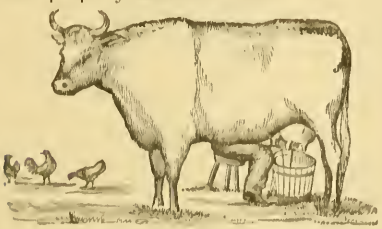
II. What Constitutes Good Care and Kindness.

Humane treatment of animals consists in providing comfortable quarters; the training of stock to what they are expected to perform, rather than "breaking" them into it; furnishing plenty of good and wholesome food, and so placing it that it may not be trampled under foot and wasted. Once the owner gets the confidence of his stock, the balance is easy, and it is cheaper to do this than to have them lose flesh, from the constant fear of injury.

Two illustrations will suffice: The first shows a cow that has been beaten with the milking-stool, when restless from being annoyed by flies,

or from brutal handling of the teats. She has resented this treatment with her heels. She kicks and runs at every opportunity, and often, at length, without provocation. If offered for sale, unless deceit is practiced, she will not bring half the price of a well-trained cow; and a man once cheated with such an animal will steer clear of the person who deceived him. The second picture represents a cow that has been properly cared for when young. She has been trained to know that she will not be abused, and instead of kicking over the pail, will simply move her feet or her tail when the flies bother her. If flies are bad, cover her with a sheet when being milked, or have a rather dark place to milk in.

RESULT OF BAD HANDLING.



RESULT OF GOOD HANDLING.

III. How to Manage a Kicker.

Have you been so unfortunate as to become the possessor of a cow made ugly and vicious? If she kicks, a harness made like that represented in the illustration, so that a pad can be brought to press tightly in each flank, by means of the guards forced down into one of the notches, will cure her. It will, in fact, hurt her when she kicks. A strong cord drawn tight just back of the shoulders will answer in the majority of cases. For exceptionally bad kickers a close pen must be made, into which the cow is driven. It must be only wide enough to admit her, and have a post set at the proper place against which to tie her leg. At length it will only be necessary to throw the strap around the leg, and finally she may be milked by simply driving her into the pen. In all this no violence must be used. Get her quietly into the pen a few times, at whatever pains,

TO PREVENT A COW FROM KICKING.

and she will soon learn to go in without difficulty. Either of these plans is easier and cheaper than trying to break her of the habit by blows. That only makes a bad matter worse.

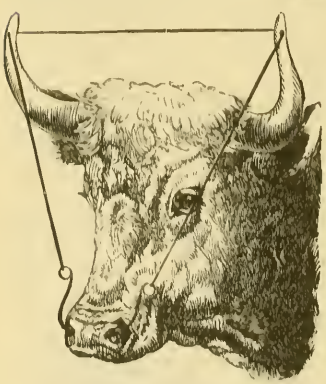
IV. To Prevent Sucking.

Sometimes a calf, not properly weaned, will acquire the habit of sucking other cows, and there are generally good natured cows that will allow it. To prevent this, have a spiked muzzle made as shown in the engraving, not so tight as to prevent grazing, but sufficiently so to prevent her from sucking. If a cow suck her own milk, a harness as shown in either of the two cuts of harness for cows, on the next page, will keep her all right. The second form we consider preferable.

TO PREVENT SUCKING.

V. Devices to Prevent Goring.

If an animal—cow, ox or bull—is vicious with the horns, it should be gotten rid of at once, unless it be so valuable as to make it an object to go to considerable trouble to prevent its doing mischief. The same rule will apply to animals having any vice. Sell them or fatten them, unless their value makes it necessary to suffer the inconvenience. A good arrangement to prevent hooking is represented in the annexed picture, of a vicious ox's head. Once it is attached, the animal attempting to gore will only pull its own nose. An effective harness for hampering a vicious bull is also shown in the illustration on next page. With this harness on, no bull, however ugly, can do serious harm, either to man or beast.

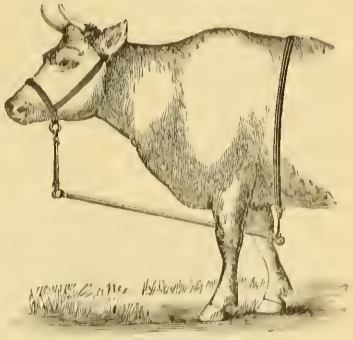


TO PREVENT HOOKING.

In mild cases, good balls securely fixed on the horns will be effective to prevent goring. They should always be fixed to the horns of bulls, and of

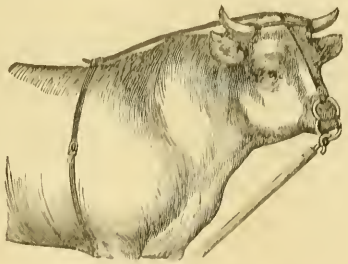
sharp-horned oxen and cows as well. Select rather large-sized brass tips, with a good screw thread inside. Fasten the animal securely; put two

HARNESS TO PREVENT SUCKING.



A BETTER FORM.

large, round potatoes in the oven to roast, and when sufficiently hot, stick one on each horn, to soften the tips. When soft enough, or before the



HAMPERING A VICIOUS BULL.

potato becomes cool, screw the balls as firmly as possible on the end, using a wrench and they will never come off.

VI. Driving to and from Pasture.

This, if entrusted to boys, without due caution, often results in injury to the animals. From sheer animal spirit, the boys will often drive them on a run, or make them jump the partially lowered bars. The first diminishes the flow of milk if it does not make it bad from overheating; and the second often occasions injured limbs. We have even known a cow to

fall and break her neck in jumping the bars, to say nothing of the breachy habits they are apt to acquire from such usage. Hence it is important that the boys be perfectly trained, as well as the cows.

VII. Amenities of the Barn Yard.

If all farm stock are properly trained, they will live together in good fellowship, if the occasional incorrigible one is prevented from doing mischief. Even a too belligerent cock may be rendered crest-fallen by cutting his spurs, and a goring cow may be prevented even from injuring sheep by the nose piece and cord through the horn. Yet it is altogether

A HAPPY FAMILY.

better to get rid of unruly stock at any price, and then your farm yard may present the appearance of the picture we give of "A Happy Family."

VIII. As Between Good and Bad Management.

We have already stated that humane management does not consist in expensive buildings, or costly fixtures. The poor man's stock may be just as well cared for at a cost within his means, as that of the rich man. The rich farmer may not, indeed, make so much profit as the poorer one, even with all his fine buildings. The profit in feeding, for instance, is in so managing as to get the best returns for the food given. Some kind-hearted persons stuff their animals so full that they are uncomfortable. This is neither kindness nor good management.

IX. Assimilation of Food.

The system will properly assimilate a certain amount of nourishment, and no more. All that is given beyond this is a dead loss. All that is given below the required quantity is at a sacrifice of future profits. Both show bad management. While general rules may be given, every man must be competent to judge for himself, and hence the care we have taken in explaining and describing all that relates to the animal, so far as may be judged from outward appearance, and from the bony and physical structure.

THE PASTURE OF FARMER "WELL-TO-DO."

A pleasant picture may be seen in a view of a portion of the farm of Farmer "Well-to-do." Here we have the general appearance of quiet and good management; it is a far more eloquent lesson than whole pages of print.

X. Two Ways of Looking at it.

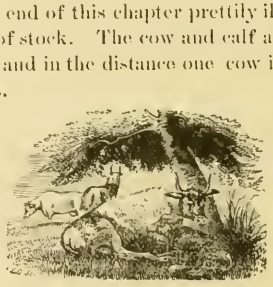
The wealthy man, especially the amateur, too often spends money for the sake of appearances solely. His stables will be too costly for profit, his appliances too elaborate for practice. The practical man will reach the same end so far as feeding and shelter are concerned, and with profit to himself and comfort to his animals. His shelters may be most homely, even made with poles and straw, but they are warm and comfortable.

He cannot afford iron mangers and water pipes in his stables, but his troughs are tight and solidly built, and his animals are regularly fed and watered. He may not have blankets in winter and sheets in summer, but his animals will be well and carefully fed, and sheltered from the earliest age until ready for sale.

XI. The Profits of Humane Treatment.

Two years ago, in writing on this subject, we reviewed the matter of feeding as follows. We do not know that we could better it by re-writing it, and thus we quote: "The humane man will get ten dollars more for a cow because she will be gentle and well trained to give down her milk without resistance. His steers will bring from one to two cents per pound extra in market, for the reason that the constant care given them will have resulted in extra weight and condition. Let us see what two cents per pound amounts to. His steer of a given age, say three years, is fed from birth so that it has never fallen in condition, but has constantly gained, and will weigh from 1300 to 1600 pounds, according to the breed. The steer of the man who does not believe in feeding nor properly treating his animals, will weigh off of grass 900 or 1000 pounds. The good feeder will get five-and-a-half cents per pound gross weight, or $71.50 for the 1300 lb. steer, and $88 for the heavier one. The poor feeder will get, say three cents per pound, or $27 to $30. One may see this every day of the year at the stock-yards of our western cities. It does not cost $20 more to make the good steer than the poor one; so the enhanced profits are nearly $25 in the one case and $48 in the other; in other words, the good and humane feeder gets the enhanced price on the poor feeder's 1000 pounds, and on what he has put on besides by his considerate care and constant good feeding. We have partially shown this in another part of the work, in alluding to the daily animal waste. That is one integer. Another is that animal waste may be produced excessively, whatever the system of feeding, if animals are subjected to frights and bruises, as well as by exposure to storms and lack of sufficient food."

The little cut at the end of this chapter prettily illustrates some results of humane treatment of stock. The cow and calf are quietly chewing the cud in the foreground and in the distance one cow is watching for danger while the other drinks.



CHAPTER XVI.

THE TRAINING AND WORKING OF CATTLE.

I. THE DIFFERENCE BETWEEN TRAINING AND BREAKING.——II. WHEN THE WHIP IS NECESSARY.——III. TWO WAYS OF DOING IT.——IV. ADVANTAGES OF TRAINING YOUNG.——V. WHAT AN OX SHOULD BE TAUGHT.——VI. TRAINING THE CALF.——VII. TRAINING TO LEAD.——VIII. TRAINING A BULL.——IX. TRAINING A MILCH COW.——X. HOW TO MILK PROPERLY.——XI. DO NOT FEED AT MILKING TIME.——XII. HOW TO MANAGE A KICKING COW.——XIII. HOW TO TRAIN STEERS.——XIV. TRAIN THEM WHILE THEY ARE YOUNG.——XV. A SUMMING UP.——XVI. A SAILOR AS A TEAMSTER.

I. The Difference Between Training and Breaking.

This subject of training vs. breaking has been pretty fully treated of in the chapters on horses, and the same general rules will apply to all farm stock. The horse must be highly educated in order to get the most satisfactory labor out of him; so must all other farm animals, but it is not necessary that their education be as perfect as that of the horse. The difference between the two systems is, that in the one case the law of kindness is used, by which the animal is taught to rely solely on the master's will, and is also taught that disobedience will result in inconvenience and pain. In the other case, the animal is subdued by main force, under the whip alone, and comes to regard the master as a terrible power simply to inflict injury, and consequently works solely under the impulse of fear.

II. When the Whip is Necessary.

In some cases, even after careful training, the whip is necessary in subduing a refractory animal. Perverseness, however, is often the result of misuse by a previous owner. If the animal has been broken under the whip, the continued use of the whip will be necessary. If he has been properly trained, the whip will seldom be necessary, and, generally, only as an admonisher when some extraordinary exertion is to be made. This is its sole use, except as an instrument of correction for a refractory animal when training, and sometimes after the animal is trained. A bull must be trained under the whip; but once trained to the service he is to perform, the whip will seldom be required, if a good ring is put in his nose.

Animals are not naturally stubborn unless their innate power of resistance is brought out by abuse. They will generally do what is required

of them when once they know what is wanted. Animals cannot be expected to understand as a child will They have not the power of direct

UNDER THE WHIP. A BROKEN TEAM.

speech, and thus we must use signs, their natural means of communication, as well as words.

III. Two Ways of Doing It.

We give two pictures from real life. One shows a savage teamster working his animals by main force, under the whip. In the other is seen

BY THE POWER OF KINDNESS. A TRAINED OX.

a good trainer driving his willing ox without lines, and guiding him solely by the sound of the voice. It is not difficult to see which will get the most

labor out of his team and in the easiest manner. Of course, the time has passed when tobacco is rolled to the warehouse in the manner represented in the first picture. But in many new settlements, a single ox is still used to plow corn and other crops; and a very good and tractable power he

"THE GOOD OLD WAY."

makes, if rightly handled. We have even seen a cow plowing corn, and if the master have no better team, kind and careful usage will get considerable labor from her, and milk besides. Such labor is certainly no harder on the cow than is the task imposed on the woman who rears a family, and has to do the household work. It is not economical or humane in the one case or the other, except under dire necessity.

IV. Advantages of Training Young.

In the preceding chapter we have illustrated the difference between ill and good usage in the management of cattle. It is with animals as with children. Brought up under blows and curses, they make in the one case, vicious or unwilling servants, in the other case brutal men. The earlier the training of all farm animals is begun the better. In the chapters on horses we have inculcated the principle that colts should be trained young, and have shown that this course really takes no more time in the end than to allow the animal to get its full strength before beginning to train. The same is true in the training of cattle. In fact, it is an economy of time and labor to begin the training at an early age, for the young animal has not the power of resistance, and being subjected to the influence of a kind master, never learns its strength. In nine cases out of ten, all the difficulty experienced in "breaking" results from the fact that the animal has been allowed to go too long without being made familiar with the presence and control of the master.

V. What an Ox should be Taught.

All that is expected of a pair of oxen is, that the off ox shall stand quietly to be yoked, and that the other shall come promptly forward at the word, and pass under the yoke; then, that they shall step briskly forward with the load, turn promptly to the right (haw) or to the left (gee), and stop promptly, or back up at the word.

The instructions given in the chapters on the training of horses, will suffice for haltering and training of cattle, with such modifications as will naturally suggest themselves in addition to the hints given below. The trainer must distinguish between stubborn ugliness, and lack of comprehension in the animal. But even stubbornness is more easily conquered, by simply rendering the animal uncomfortable until it attends to the wishes of the master, than by beating it for something it knows not what.

VI. Training the Calf.

Let us suppose the calf not to have been raised by hand,—for if so raised it should have been taught to fear nothing—but that it has sucked the cow until ready for weaning. In this case the first thing to do is to give it a name and thereafter call it by that name. If the name is associated with something the calf likes, the calf will soon understand it and come when called. The next step is haltering. Get the calf, as quietly as possible, into a close place, with its dam, and put on a halter it cannot break. Turn out the cow and let the calf pull until it gives up, watching that it does not injure itself, and pushing it forward occasionally to cause it to know that it is easier to stand without pulling.

VIII. Training to Lead.

The next step is training to lead. Take the calf into a close yard. Have a six-foot rope at the end of the halter. Standing in front of the calf, say "come," calling it by name. At the same time pull a little on the rope. The calf will not, of course, do as bid. Call again, and let an assistant touch it lightly from behind with a whip, gather in the rope, and when you succeed in getting the little animal near you, fondle it and give it something it likes—sugar or salt. Be patient. Do not lose your temper. When the calf will come to you, and follow you, teach it to lead—walking by its side and restraining it if necessary. Then teach it to be

ONE WAY OF RINGING A BULL.

handled, carded and brushed in the stable. It will not object to this if you do not hurt it. This accomplished, the animal is half-trained if a cow calf, and nearly so, if a steer. In using the card and brush, do so with a light hand, never using the card, or curry comb, over the bony surfaces.

VIII. Training a Bull.

Bulls require the most careful training and management. They must never be allowed to gain the mastery. If so they will soon assert their power, and become dangerous. They should have a good ring placed in the nose before they are one year old. To insert the ring, first whittle

a piece of soft pine, so it may be entered into the nostril to meet the blow given on the punch. Select a punch to make a hole corresponding to the ring. Tie the bull securely and let an assistant hold the piece of pine. Set the punch in the opposite nostril, low enough so that it will not cut the cartilage (gristle) of the nose, and strike a smart blow, forming the hole. Put in the ring, set the screw tight and the work is done. The illustration will show the old fashioned manner of ringing a bull, with a cutting awl. The plan we have described is better.

IX. Training a Milch Cow.

Handle the udder and teats of the heifer often while she is growing, this will have a two-fold effect. It will cause extra development in those parts, and at the same time make the heifer gentle, so that when she comes really to be milked, but little difficulty will be experienced.

If the heifer, or cow, has never been thus handled, a pen should be made five feet high, and just wide and long enough for the animal to stand in. Have a safe bar behind, at the height of her buttocks, and a place at the side to milk through. Tie her by the head. Then gentleness and perseverance must do the rest. In no case strike her. There is no danger of the milker being kicked, for the left hand holding the teat with the wrist pushed strongly against the stifle, will prevent the heifer or cow from using her heels for injury. Patiently show her that she will not be hurt, and under careful milking she will soon come to feel that the operation is connected with ease to herself. If the udder is inflamed or the teats sore, use cold water for the first and glycerine for the latter. This again will cause her to associate the idea of relief with the operation of milking.

X. How to Milk Properly.

Always wash the teats and udder with lukewarm water if they are dirty, or brush them with a soft brush if they are only dusty. Set down on the off or right side, so that the right hand will be nearest the cow's head. Take hold of the rear teat nearest you with the left hand, and using the word "hoist," induce the cow to place the leg, against which you press your wrist, farther back than the opposite one. The pressure of the arm should carry the leg back.

In milking, grasp the teats by the upper portion, and, diagonally; that is, one fore and one hind teat on opposite sides. Grasp the teat well up to the udder with the thumb and fore finger, and bringing the other fingers successively together, with a slight pull force out the milk.

So proceed with one hand and then the other until the milk is about drawn, and then change to the other teats. Never strip the milk by pulling

the teat with the thumb and fore-finger, from end to end. Every drop can be drawn by pressing the top of the hand well up under the udder, grasping the teat, gathering the milk with the thumb and fore finger, and drawing it with the other fingers. It must be learned by practice, but is not at all difficult.

DEVICE FOR HOLDING THE PAIL.

Another important thing is to learn to milk fast. If the milk is not drawn as fast as it is given down, in the end it may be withheld. In any event, slow and especially imperfect milking soon dries up a cow. As an assistance to the milker two illustrations are given, the first showing a device for holding the pail, which any blacksmith will quickly make, and the other the manner of using it in holding the pail. One of these for each milker will save many times its cost in a single season.

MANNER OF HOLDING THE PAIL.

XI. Do not Feed at Milking Time.

Many persons, supposing that it induces the cow to let down her milk, or that she will stand more quietly, give a feed at milking time. This should never be done. The act of eating induces moving about; and, expecting the mess, if for any reason it be withheld, the cow becomes restless, however gentle she may be. Many good dairymen feed only after milking. It is a good plan, under the rule of compensation. Yet, if the stable is to be cleaned before milking—and it should be—the better plan is to feed before milking time. It is the rule we have always adopted. We have also caused the milker to give the cow a taste of salt, or a single mouthful of the best, sweet, soft hay just before sitting down to milk. There is nothing puts an animal in better humor with the milker.

Once milking is begun, milk fast and steadily, and without talking, until it is finished. If you have a milker that cannot keep a cow quiet, be sure something is wrong with the man. You cannot afford the loss in milk, that will inevitably ensue from this cause, and the proper way is to discharge him at once, or put him at other work.

XII. How to Manage a Kicking Cow.

One peculiarity of animals is, that once they acquire a vicious trick, it is difficult to break them of it. If a horse once runs away, he is never

safe thereafter. So, if once a cow acquires the habit of kicking, she will try it on with every new milker who takes her in hand. Hence the advice we have given, to convert all tricky cows into beef as quickly as possible. If the cow has some unusually good qualities to compensate, it may pay to keep her; but, remember that tricks "are catching," simply from the restlessness created in the milking yard.

How we once subdued an inveterate kicker, but deep milker, is as follows: A strong man held her steady by the horn and nose. Seizing a teat firmly in each hand, but without attempting to milk, except to perform the motion, she was allowed to kick to her heart's content. Soon she found that the wrist and arm brought the kicking leg back again to its proper place on the ground, without fail. When she ceased kicking, milking proceeded, and when she kicked, the grasp was tightened. In the end she submitted quietly. The next lesson was to teach her to stand quietly without holding. This was accomplished by following and forcing her to walk about the yard, until she was willing to stand still. At the end of a week she became perfectly quiet to milk, so far as her trainer was concerned, but no other person could milk her. A better way for all such animals, is to provide a pen, such as we have previously described, and then any good and quiet milker can manage the most refractory animal.

XIII. How to Train Steers.

All that is required of oxen is that they move briskly at the word; draw steadily; back promptly, and as much as they can draw forward; that they exert themselves to the fullest extent, but slowly, when necessity requires, and that they stand quietly. To meet these requirements you must have something better than dull, lazy, logy brutes. If for heavy logging, of course agility must be sacrificed to strength; but if circumstances will allow, three yoke of smart steers are better and more economical, than two yoke of heavier slow ones. They must, however, be trained to pull together, and in using a single yoke, it is absolutely necessary that they walk and pull evenly.

Select steers of medium size, compact and as near alike in disposition, carriage, pace and color as possible. If they are three years old past, they may be put in a freighting team, if possible, with a well-trained yoke of cattle at the pole and another in the lead. Tie them up so they may be yoked, and so proceed until you have the requisite number together that are to be trained. Once yoked, put them in the team, and do not unyoke them until they understand what is wanted of them. It may take a week. Feed well, and see that the yokes are well-fitting, so as not to gall the shoulders or necks. When they pull steadily forward, understand "haw" and "gee"—that is, to turn to the left or right as the

case may be,—and back promptly with the well broken oxen, they can be trained as single yokes, which must be accomplished with each yoke separately.

XIV. Train Them while They are Young.

As heretofore stated, the real, preliminary training should be done when the steers are quite young. Teach them to walk quietly, but quickly at your side, to turn to the right or left, and to back at length twelve or fifteen steps at a time, and then come forward promptly again at the word, holding their heads well up when they stop, and remain so. In working them on the road teach them to move briskly, and together. Few steers are so evenly matched that they will act and move precisely together. If it is necessary to admonish both, touch the slow steer first, and the other immediately after. It is a nice art to touch both so near together that the act shall seem simultaneous. Use always the same motion, the same words, and the same tone of voice, never loud, for the act you wish the steer to perform. If one ox is slower than the other, put the slow one on the near or left side.

XV. A Summing Up.

To sum up the whole matter in a nut-shell, use common sense, and know what you are training for. If simply for general farm work, logging, or for "string" teams on the road, it will not pay to spend too much time on the training. Yet a well-trained, evenly-matched yoke of oxen will always command a sufficiently good price to pay for the training—fully as much so as a well-trained and well-matched pair of work horses.

There will be, for years to come, in the West, the Southwest, and especially in the lumber region, plenty of work for which neither horses nor mules are so well adapted as oxen. And in the settlement of a new country, where until farms are brought into subjection, there is no other feed than the wild grasses, well-trained oxen are indispensable; for a well trained yoke of steers will do one-third more, and better work, than untrained ones. Once you get such a team, train also the driver to handle them properly. An ignorant, careless or brutal driver will soon reduce the value of any team.

XVII. A Sailor as a Teamster.

We once heard a good story illustrating this. A New England farmer had a finely-trained yoke of Devon steers, such as were not uncommon there, twenty years ago, and are not now uncommon. He hired a sailor, and sent him to market with the team, having instructed him, as he thought,

in a month's time, sufficiently in driving. Coming to a bridge when there were other teams passing the sailor "lost his head," and forgetting the proper words, reverted to nautical language. "Starboard, (to the right) you lubbers," he cried, and giving them a punch, the steers sprang forward and side ways, and striking the rail, it was crushed, and oxen and load went into the creek twenty feet below, turning the yoke in the fall. Upon reaching home, and being asked what had become of the team, he answered: "Oh, the lubbers fell off the deck, and the larboard ox got on the starboard side, and the starboard ox got on the larboard side, and the whole craft went to Davy Jones' locker together." The moral is: For a thing to be well done, one must know what he is about in doing it.

CHAPTER XVII.

SHELTER FOR CATTLE.

I. THE ECONOMY OF SHELTER.——II. THE NATURAL HEAT MUST BE KEPT UP.——III. FOOD AS RELATED TO SHELTER.——IV. FOUR CLASSES OF STOCKMEN.——V. HOW TO SHELTER.——VI. SOMETHING THAT WILL BEAR REPEATING.——VII. A CHEAP AND GOOD SHED.——VIII. A FRAMED SHED WITH LOFT.——IX. CATTLE TIES.——X. BARNS FOR VARIOUS USES.——XI. THE BASEMENT AND OTHER FLOORS.——XII. AN OBLONG BARN.——XIII. A BARN WITH WINGS.——XIV. A MODEL BARN BASEMENT.——XV. MAIN FLOOR OF MODEL BARN.——XVI. ROUND AND OCTAGONAL BARNS.——XVII. BUILD FOR THE END DESIRED.——XVIII. SUMMER SHELTER.

I. The Economy of Shelter.

The necessity of shelter of some kind for all farm stock is taken for granted, even by those who simply provide the warm side of a stack, or who consider themselves fortunate if they have a "chunk" of timber where the cattle can "keep warm." Neither the one nor the other is shelter in reality, since shelter means not only protection from cold winds but also from storms. This neither of them gives.

In all that region where cattle must be fed during four or five months of winter, the protection of barns and tight sheds becomes absolutely necessary, since one cold storm will take off more flesh than can be regained in a month. In fact, farm animals cannot thrive in the winter unless sheltered. Without shelter they must certainly lose much weight in winter, except at the expense of feed that would pay the cost of a simple structure in a single winter, and amount to from fifteen to twenty per cent. on the cost of a common-sense barn.

II. The Natural Heat Must Be Kept Up.

The natural heat of the body must be kept at 96 degrees, winter and summer. If it goes below this, a chill ensues, and in the effort of nature to counteract the effect of this, which, if continued, would kill, fever takes place. The fever also would kill if continued, so nature again comes to the rescue, and the sweating stage supervenes. This is chills and fever.

The animal, to remain in health, must be kept at a normal temperature, and this is only to be accomplished by an excess of food, or by shelter, as one of the integers. Whether it will do to go to a great expense in providing shelter is a question of cost, as related to cheapness or dearness of food.

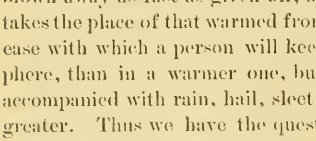
III. Food as Related to Shelter.

Where grain is cheap the increased food with simple shelter is undoubtedly cheaper, and yet food may be so scarce and high, that even fire heat may profitably be resorted to.

The Esquimaux drink train oil, to give the body natural heat in winter; civilized people eat fat meats for the same purpose, and in cold weather, it is well known that animals always crave oily food. The reason is, that such food assists in keeping up the animal heat. Hence, since stock waste more from exposure to cold, it is always economy not only that they be fully fed, but also that they be warmly sheltered. The reason is quite simple. In a still atmosphere, the animal retains his natural warmth, imparting a small portion of it to the air immediatly surrounding him; but when the atmosphere is in motion the animal warmth is, so to speak, blown away as fast as given off, and a fresh supply of cold air constantly takes the place of that warmed from the animal's body. Hence the greater ease with which a person will keep warm always in a still, cold atmosphere, than in a warmer one, but with wind blowing. If the wind is accompanied with rain, hail, sleet or snow, the loss of animal heat is still greater. Thus we have the question of shelter brought down to one of dollars and cents, in which shelter wins.

IV. Four Classes of Stockmen.

There are four classes of farmers: First, those who give no shelter; second, those who provide shelter next to nothing; third, those who have comfortable shelter, but fail to use it to its full extent, and fourth, those who have good shelter, and keep their stock under it. The first class does not need illustrating. The second, third and fourth we present in a series of cuts which tell their own story pretty fully.



A SHIFTLESS FARMER'S BARN.

The Shiftless Man's Shelter.—This man always has "hard luck," and all his surroundings are of the same kind as his luck—hard. His animals are never in condition for labor, for they are half starved and badly sheltered. His barn is worse than "all out doors," since water drips through the roof, and the wind blowing through, creates drafts, and the temperature is actually below what it is outside. Hence, such shelter is really worse than none, for, while cooped up in it, the poor brutes are denied the privilege of exercise.

Farmer Slack.—Farmer Slack has abundance of shelter, as the illustration shows, but believes that store cattle, at least, need to be toughened

by exposure to the winter blasts. If a sudden storm comes on he "guesses the brutes can stand it," with a "morsel more" of fodder. His fattening and working stock and milch cows are in the barns. Can he not see that if it pays with them it will pay "all around."

Farmer Thrifty.—Farmer Thrifty believes in having good shelter and in using it. He believes not only in sheltering his stock, but in sheltering his yards and barns also. With the snow lying thick over everything, there is no sign of life in the ample yards, save the hands about their work, and the chickens, which also have warm quarters at night. The cattle are all comfortably housed inside.

V. How to Shelter.

It seems unnecessary to follow the subject into details. The most simple shelter is the artificial protection of wind-breaks, obtained by the planting of belts of evergreens and deciduous trees. It is the crudest sort of protection, next to a tight board fence. If the fence is topped with a lean-to roof we have one of the simplest forms of shelter. Another form of shed—and the crudest—is of posts and poles covered with slough hay. If placed in the timber it makes an excellent protection for stock cattle.

PRIMITIVE SHELTER.

A Good Shed.—Still another cheap shed is made by setting posts in the ground in two lines, sawing the tops level, fastening on plate pieces, laying on scantling for the peak, supported temporarily, and nailing on boards, for a roof, at one-quarter pitch, up and down from the plates to the peak,

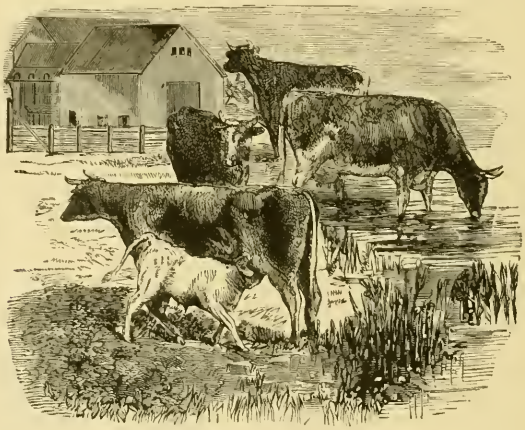
FARMER THRIFTY'S SHELTER.

covering the joints with wide battens and boarding up the side whence the prevailing winds come. If twelve feet boards are used for the roof, a shed may thus be formed over twenty feet wide, that will furnish good

shelter for stock cattle where forage is cheap. If the shed be placed in the timber, or where timber belts protect from wind, there need be no sides, and a rack may be put through the center out of which the cattle may feed, the hay being put in from the ends and directly from the wagon.

VI. Something that will bear Repeating.

We have heretofore written on this subject of cheap shelter in new countries, and have lived to see these crude structures give place to substantial feeding barns and basement stables; we repeat the direction originally written at various times during our journalistic experience. There is yet a vast outlying territory to be settled up, and, when the pioneer



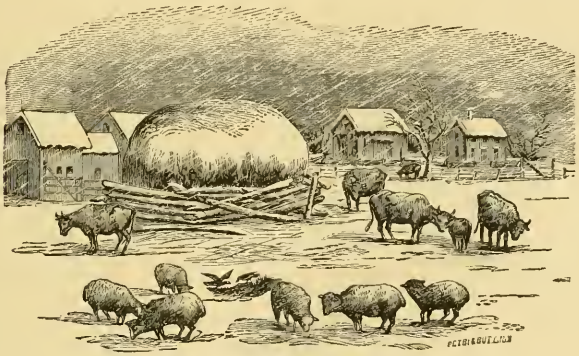
FARMER GOODENOUGH'S BARNYARD.

has to live in a log house or sod hut, the stock protection must necessarily be crude. In the directions given in the next article we leave much to individual judgment, since any structure must not only be modified to suit the purse of the builder, but also to suit the materials which he uses. In fact, one of the warmest sheds we ever saw was laid up at the sides with sods, and protected from being thrown down from the inside by poles. A shed boarded up is really all the better for a "backing" of sods.

VII. A Cheap, Good Shed.

Any farmer tolerably handy with hammer and saw, assisted by his hired men, can make one. Suppose the structure is to be a simple roofed shed affair. Decide upon the length. The width should not be more than twelve feet for a single pitch roof. Allow that it is to be ninety-eight

feet long. Set four heavy posts for the corners, three feet in the ground, and of the required height. The lower it is the warmer it will be, so it be high enough for the cattle to walk under the plates. Between the two end posts set, exactly in line, six posts each fourteen feet apart, and five and one-half feet high from the average ground line. Proceed in the same manner with the front, the posts to be nine feet above ground. At the back, now set seven lighter posts in the fourteen feet spaces. Saw them all off to an equal height, spike on four inch scantling from post to post in front, and two by four for the back. It is now ready for the roof, which is to be firmly nailed from front to rear. Board the front down to within five and a half feet of the ground, and the ends and back entirely down to the ground. Thus the shed is complete, except



A SLACK FARMER'S SHELTER.

banking up. This is important and will add fully one-half to its warmth. A good way to do this is to lay two lines of sods at the rear, breaking joints as in laying brick, carrying the banking at least four feet high; or posts may be set two feet from the wall, with sufficient strips nailed thereon to hold litter, and the whole filled in and rammed tight. It is simply a question of the adaptation of the means at hand to the end sought. From this we may go on to more and more elaborate structures until we come to the barn proper.

VIII. A Framed Shed with Loft.

This may be made by running the posts up eighteen feet and framing in cross-ties to support a floor. In the upper twelve feet of this shed a good deal of fodder may be stored, to be fed from when the weather is

too inclement to allow it to be handled on wagons. In this case a feeding rack may be placed below, with feeding holes from above. Thus the hay may be thrown directly into the loft. In such a shed it would not be economical to form a single pitch roof. It should slant both ways.

Converting the Shed into a Stable.—If the shed form is to be converted to a stable, use the directions given for a hip or double-roofed shed. Board the whole tight all around, leaving space for doors and windows; batten the cracks, lay the floor, put in stanchions or uprights for fastening the cattle, leaving a feeding place in front, and the whole is complete.

IX. Cattle Ties.

We prefer rings that slide up and down, upon standards three inches thick, to stanchions. This style of stable will not be strong enough to allow their being fastened to the floor above. Set strong posts seven feet apart and four and a half feet high, sawed off square on top, and three feet out from the wall. Prepare six-inch scantling to be pinned firmly to the posts, twelve inches from the ground, and on the inside next the wall; the scantling bored, each three feet, with two-inch holes. This will be wide enough for cows. Larger cattle must have three feet, three inches. Prepare other scantling bored in similar manner for the tops of the posts. Take three-inch smooth saplings; sharpen the lower ends just so they will drive firmly into the holes in the lower scantling when it is pounded in place below. Shave the upper ends so they will fit the holes in the scantling above. Drive them solidly into the holes below, pinning each one fast with a half-inch pin. Slip a four-inch iron ring over each stake. Lay the upper scantling on top, entering the standards as you go. It is better that they have some play. Lower the scantling on top of the posts, and pin and spike them firmly to the posts. Cut stout rope six feet, six inches long, splice a four-inch loop on one end, whip the other end with small cord so it will not unravel; pass the rope through the ring and back to the loop so the end of the loop will be eight inches from the ring; pass the end of the rope through the loop, draw tight and make fast with two half hitches, or, better, whip the two portions of rope together as far as the loop. The cattle are then ready to be tied up by passing the rope about the neck and through the loop, and drawing just tight enough so the animal cannot slip it over the horns. Iron chain bails that will last a life-time are kept ready made by agricultural implement men, and are much the cheapest in the end. Tied thus, cattle can easily reach their food, can lick themselves, can rest perfectly, but cannot reach to injure each other. A six-inch board nailed

along the standard at a proper height, say about six inches below the tops of the shoulders of the cows, will prevent their reaching too far into the feeding passage.

X. Barns for Various Uses.

As soon as the farmer is able so to do, it will be found cheaper in the end to build substantial barns. They are a permanent investment and are to be estimated simply in relation to the interest on the original cost, and wear and tear.

Modern barns are always built high. Modern implements and machinery for storing forage and grain, deliver into the top of a barn about as cheaply as from below. When there is a location suitable for a basement, use it by all means; and the nearer square or oblong the barn is, the more economical it will be, especially if wings are to be added, as the increasing necessities of stock and forage may require. By a basement we do not mean a cellar, but the lower floor of a barn built on a declivity, so it may run into a bank at one end. A fall in the land surface of six feet in the length of the building will be sufficient, since the earth excavated may be used for the embankment at one end.

XI. The Basement and other Floors.

Thus the basement may be used solely for stabling cattle, sheep and calves; or a part of it may be used for storing heavy tools and machinery. The main floor will contain bags for hay and grain, the threshing floor, harness-room and a granary. The grain, however, is better stacked outside, unless the intention be to thresh it by means of a small stationary power, as it may be wanted, for feeding and bedding—the power also to be used for grinding feed and chopping fodder.

Make the barn as high as the power will carry hay and grain. Continue the hay to the roof. Cover the horse stable, if there is to be one, the harness room, granary etc., with matched lumber, and form a mow overhead: also, a floor may be carried over the threshing floor, and this space utilized in the same way. Practically you have the space at less expense. In fact, utility will be suggested in many ways, other than we have mentioned.

XII. An Oblong Barn.

In the West and South, the farmer of 160 to 200 acres may get along very well with a side-hill barn forty-two by sixty feet. It will give ample room for a bay 16 by 60; a floor 13 by 60; horse stable 13 by 60, containing 5 single and 1 double stalls, or 2 single and 3 double stalls; a room for implements 10 by 13; a granary 12 by 13, and a tool room half that size; while the basement may be devoted entirely to the stabling of cattle,

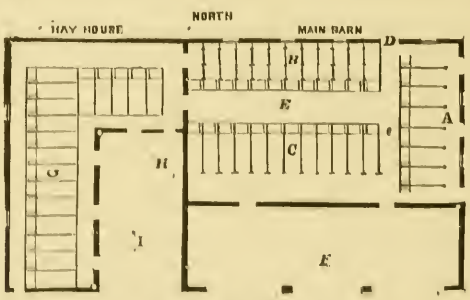
with calf pens, a sheep pen, and, if necessary, a shed enclosed on three sides. The granary will hold over 600 bushels of grain, and may be divided into bins for Winter and Spring wheat, oats, barley, and ground feed for stock.

The basement may contain two rows of cattle stalls, with passage way between, six feet wide, with shoots leading to the upper part of the barn for delivering hay, grain, and other feed. This will leave a space 12 by 60, which may contain calf pens and a place for sheep, and it may be so arranged by means of sliding doors that it may be entirely closed in inclement weather. This basement will contain stalls for thirty-two cattle, and the manure may be thrown directly into a cart or wagon and hauled where it is wanted.

This barn may be enlarged by adding on, to accommodate any required number of stock; but if a much larger barn than this is wanted, the square form should be used. It will give largely increased room in proportion to the cost.

XIII. A Barn With Wings.

Below we give an outline of the basement of a barn forty feet wide and sixty feet long, with a lean-to overshot extending twenty feet in front.



MAIN FLOOR OF BARN.

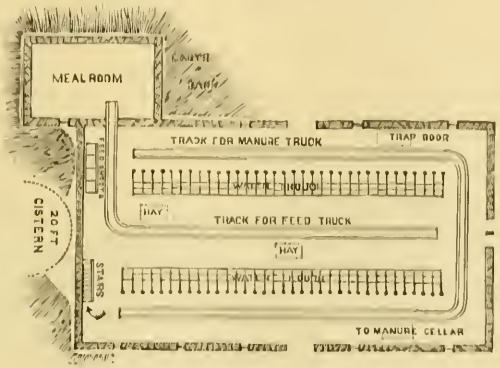
This barn will contain about 100 tons of hay. The barn would be better facing the south if the lay of the land as to declivity will allow. The hay-house may extend twenty feet in width and height in the form of an L and of such a length as may be wanted for storage, say forty feet. This barn, if the space below the hay-house is utilized, will stable six horses and forty cattle.

The basement of the main barn may be divided into stabling as follows: A, horse stables 12 feet deep, with mangers two and a half feet wide for hay, with suitable troughs for grain and manger for hay; B and C are

cattle stalls. Those in B hung with swinging gates, opening side ways, G the same, but each stall having a separate gate entering direct from the yard. E is the main entrance eight feet wide and may contain feed chests; *c* is an entry five feet wide, with steps up to door D, and having an entrance into the horse stables at each end. F is the overshot or shed. G is the portion under the hay-house to be utilized in stalls, if the hay is not desired to run clear to the ground; and H is the yard connected therewith. If necessary this may be roofed over making additional shed room.

XIV. A Model Barn Basement.

The following diagram for a basement to be used for fattening or dairy stock will explain itself. We have shown a cistern and meal room



A MODEL BASEMENT.

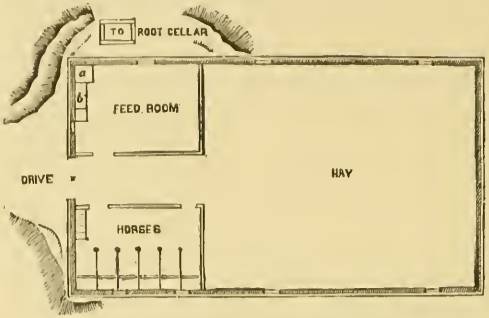
protected from frost. Or it may be used for roots and other feeding material that requires to be kept from freezing.

XV. Main Floor of Model Barn.

The following diagram shows the main floor of the same barn and needs but little explanation: *a* is a ventilating shaft, *b* feed shoots to basement through trap door, shown in the plan of the basement.

When extra care is to be given, as in the case of very valuable cattle or those to be finished up as show cattle, box stalls or pens are sometimes built in the feeding room or in a separate building as shown in the illustration. Where expense is not a consideration they furnish the very best,

though not the most economical means of fattening. The feeding and water boxes may be arranged to slide on rods, to any required height,

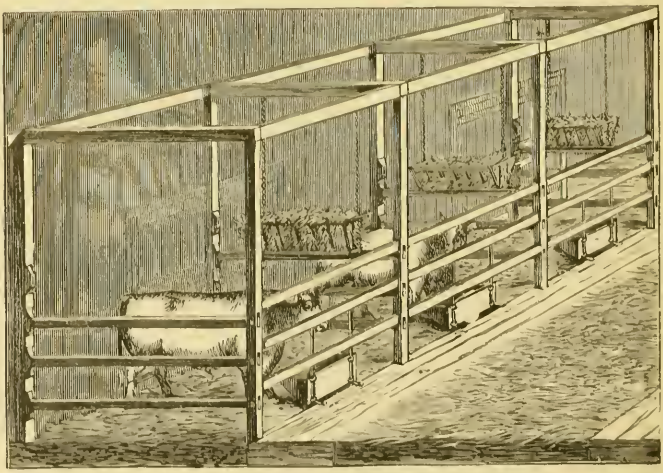


MAIN FLOOR OF FEEDING BARN.

and the hay rack is suspended on chains, so all may be easily taken down when not required, and the space arranged for other purposes.

XVI. Round and Octagonal Barns.

These can neither be called practical nor economical. They cost more to build than square or oblong barns, if for no other reason than that



BOX STALLS FOR FATTENING SHOW CATTLE.

they are unusual. The barn for profit should be built square as to the central building, if it is to be over forty feet wide, and a wing or wings

should be thrown out for the additional space needed. If a simple structure designed for general purposes is required, build forty feet wide and of the requisite length required for the stock.

XVII. Build for the End Desired.

The farmer ought to know, in a general way, the purposes for which his barn is required. Architects seldom give proper attention to the construction of barns. When they do, the barns they build are often elaborate, but costly and unsuited to the economical purposes required. The best barns in the country are those of farmers who have carefully studied the conveniencies and economies, and have stated their wants to the architect or carpenter in charge of the job. The illustrations we have given will pretty well cover the wants of our readers. Machinery is now made to perform so much of the labor of the barn, that a great saving may be accomplished through its use. Utilize all such conveniences that you can. They are economical in the long run, since they are in the nature of permanent improvements; wear and tear, and interest on the capital invested, only, having to be considered.

Some of the most important things to be considered, are ventilation, perfect drainage, and the case of providing water. If a reservoir be placed in the center of a mow it will not freeze; and if connected with a well by a pipe and pump, operated by wind power, and provided with a waste pipe to the ground so that it shall not run over, it will be found one of the best investments about the whole building. From this reservoir water may also be carried to the dairy and dwelling, and thus several forms of utility can be secured by one outlay.

XVIII. Summer Shelter.

The question of summer shelter is important, especially in the West and Southwest, where biting insects are so plentiful. The most that is needed is a partially dark, but well ventilated shed, to which stock may retire at will. Discard pasture trees. They are poetic, but not practical. A shed covered with boughs is better than the shade of a tree, and there are no roots to suck moisture from the surrounding grass. Stock in open fields seldom seek shelter from the sun. It is flies they dread. If there is a water course in the pasture, plant it by all means with trees, but do not be fooled by the old poetic sentiment of single trees here and there. Stock will often spend time under them that ought to be employed in feeding. While in motion in the act of grazing they do not suffer from heat. Therefore it is better that they be obliged to do some

travel to reach the shade, and this shade if natural, will generally have water near. If not, the artificial shade, should be given at places where water may be had most cheaply.

Shelter can, of course, be given in the barns or sheds in spring, until the grass is so flush that stock require no other feed; and when the pastures become so bare in the autumn that some feeding is necessary, the same rule will apply. What is wanted is a range where stock may not only be secure from the winds of driving storms, but where they may retire for shelter during the extreme heat of summer days. This is not to be had by planting single trees here and there. So far as protection is concerned, shed-room is the best in every respect.

CHAPTER XVIII.

DAIRYING AND DAIRY BUILDINGS.

I. A PROFITABLE INDUSTRY.——II. OUR DAIRY PRODUCTS.——III. THE DAIRY BUILDINGS.——IV. HOW THE FACTORY IS BUILT.——V. THE MANAGEMENT OF MILK.——VI. PATENT CREAMERIES.——VII. DRIVING OFF ANIMAL ODORS.——VIII. TEMPERATURE OF THE DAIRY ROOM.——IX. BUTTER MAKING IN EUROPE.——X. DAIRY BUTTER IN THE WEST.——XI. HOW TO COLOR BUTTER.——XII. SALTING.——XIII. HOW TO PACK BUTTER.——XIV. PREPARING A PACKAGE FOR USE.——XV. CHEESE MAKING—CHEDDAR CHEESE.——XVI. CHESHIRE CHEESE.——XVII. HOW TO PREPARE RENNETS.

I. A Profitable Industry.

The dairy interests of the United States have assumed immense proportions within the last ten years. It is well known that under the old way of guessing at temperature, proportion of rennet, quantity of salt and other flavoring, no uniformity could be attained in the manufacture of cheese. Under the new or factory system, great uniformity in quality is secured, and a great saving in labor and material effected.

The making and curing of cheese are, for the most part, a series of chemical transformations, requiring precision and care. The same is true of butter. Great cleanliness is required throughout. In either case the milk must be scrupulously kept from taint or bad odors. To this end a proper dairy building, and a suitable ice house are necessary. The cows for the dairy require to be selected with care. These have been fully treated of in the chapters on cattle. Grasses for the dairy are also important, as well as other proper food. These, also, have been treated of in Chapter XIII.

Without grasses, sweet, succulent, and that shall follow the season in succession, says the American Encyclopædia of Agriculture, the dairyman can not hope to compete with his more practical, if not more intelligent, neighbor, who has paid due attention to this keystone of dairying, grass. With a succession of sweet, succulent grasses from spring to fall, supplemented with proper forage plants during the latter part of July and the whole of August, plenty of good clover, Timothy, Orchard grass, and Red-top for winter feeding, and an abundance of ground grain, to be used both during the drought of summer, and during the winter, and proper implements, utensils and buildings, we have the foundation laid for making money, in one of the best paying branches of agriculture.

II. Our Dairy Products.

The United States is producing annually 750,000 tons of butter, of which we exported 11,000 tons during the year 1879; and 100,000 tons of cheese, of which we exported 61,000 tons during the year 1879. In 1880 the export of butter was about 20,000 tons, and of cheese nearly 72,000 tons; and the work just quoted adds, upon the subject of this branch of agriculture that, within the last twenty years, an export of cheese alone of 1,163,000,000 pounds, and a total value of exported butter and cheese of $185,000,000 has been made. During the last ten years 885,000,000 pounds of cheese have been shipped abroad.

Thus it will be seen that the dairying interest is one of vast and increasing magnitude. Its rapid growth in the East will be equalled and surpassed in many Western States adapted to dairy products. In 1869 Commissioner D. A. Wells estimated the value of the dairies of the United States at $400,000,000. In a paper read at Philadelphia, in 1876, Prof. X. A. Willard thought it much within the truth to state the value of the products of the farm dairies for that year at $600,000,000.

III. The Dairy Building.

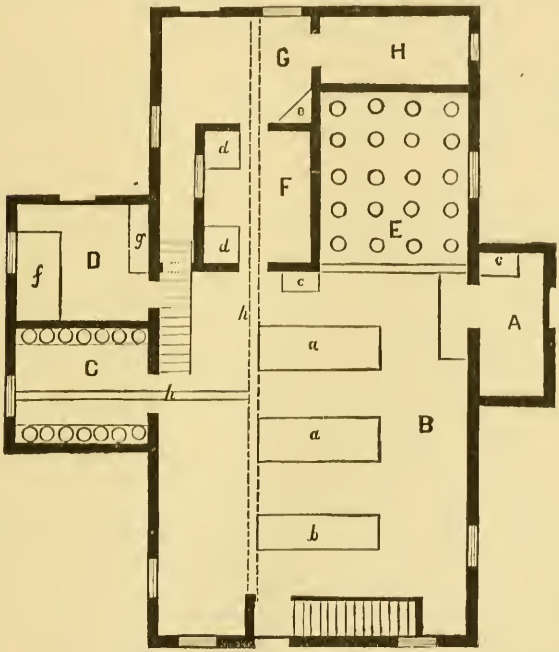
That our readers may be able to know just what is necessary in the way of a dairy building—one which may be easily modified to suit the circumstances of the owner—we give on next page a ground plan of a model creamery and cheese factory combined. This building is 26 by 52 feet, with an extension on each side. The walls have three air spaces; one of these is between the outer siding and the sheathing; the next between the sheathing and building paper, and the last between the paper and plastering. The windows are also double. Thus is completely secured an equal temperature, and also a perfect isolation of the milk and cream from odors either of manufacturing or curing.

The milk, when received and weighed, is strained directly into the vats or into deep cans for setting in the cold pools. The pools are of cemented brick; they are twenty inches deep, and are supplied with water from a deep well and force pump, and also with ice. There is a press room adjoining the cheese-making room, and a stairway leading thence to the curing room.

IV. How the Factory is Built.

With good drainage there may be a basement three feet below ground, built of stone or brick. It is, indeed, better that the superstructure be of brick. There should also be a perfect chart made of the drainage pipes so that they may be readily found at any time. The drains should be made with ample fall to the outlet, and in the best possible workmanship.

The water drains may be of tile, but all drains for carrying off whey, buttermilk or other liquids except pure water should be of tight pipes, and the pipes and drains must be laid before the floor is put down and the cement carefully fitted to them. The drains should all be of sufficient size not to clog. It is better that the foundation of the floor have a coating of tin shavings, or broken glass, six inches thick well pounded down, and covered with water lime cement. Upon this a flooring of flags or bricks may be laid, covered with cement of water lime, which in time will become entirely hard, and the tin or glass below will prevent all



GROUND PLAN OF COMBINED CREAMERY AND CHEESE FACTORY.

Explanation.—*A*—Milk receiving room. *B*—Cheese manufacturing room. *C*—Press room. *D*—Engine room. *E*—Pool. *F*—Cream and churning room. *G*—Butter working and delivering room. *H*—Refrigerator. *a a*—Cheese vats. *b*—Curd sink. *c c*—Wash vats. *d d*—Churns. *e*—Butter worker. *f*—Boiler. *g*—Engine. *h h*—Whey drains.

burrowing of rats. The walls of the dairy-house should be plastered and should receive a coat of hard finish, so that they may be washed when necessary. The ice-house should be plastered with water-lime, and a vacancy left between the ice and the bottom of the house, to allow the water an easy way to escape thence into the cooling pool.

V. The Management of Milk.

The management of milk requires care in every stage from milking until it is converted into butter or cheese. We have used great care in the past, as author and editor, in writing upon this subject both from a practical experience and from the writings of the best authorities. The following directions, reproduced so far as may be necessary to a fair understanding of the subject, will pretty fully cover the ground. If the reader wishes to enter into the minutiæ of the subject, in every particular, the works of Willard, Arnold and other authorities will be found useful.

VI. Patent Creameries.

There are various ways of setting milk; among them is the Hardin method, in which the milk is strained directly after being drawn into deep pails and then covered with a tight lid to exclude air and water, the refrigerator having an ice space above the pails, from which ice water constantly drips below. If there is a spring of very cold water at hand this may be used instead of ice.

The Coaley system consists in setting the milk in deep cans, which have close fitting covers, and are surrounded by ice cold water. If the heat and animal odor be expelled before putting in, there is no tainting or souring. The cream is taken perfectly sweet, in from twelve to twenty-four hours. By this system a medium-sized refrigerator box may contain the milk of a dozen cows. Both the systems mentioned are patented.

If the milk is set in open pans under the old system, see that there is no taint of foul odors near. And all utensils must be regularly cleaned and scalded, not merely with hot, but with actually boiling, water. The essence of success in dairying is absolute cleanliness in every department, and in every stage of progress from milking to packing the butter and cheese.

VII. Driving off Animal Odors.

It is important that the animal odor be driven off before raising the cream or setting the cheese. This is done by contact with pure air. The milk is poured into a receiver, in the bottom of which are small holes, through which the milk is allowed to drop into a tank. This tank stands in cold water nearly to its brim; in this the milk remains until quite cold,

when it is ready for further manipulation. Heating the milk to 100 or 110 degrees will answer the same purpose; and then allow it to cool. The former however is the better plan.

VIII. Temperature of the Dairy Room.

The temperature of the dairy room should never be above 60 degrees, and this is the proper temperature for churning cream. The temperature of the milk should be kept as near 40 degrees as possible; and in the storage room for butter the temperature should be kept as low as 40 degrees if possible.

IX. Butter Making in Europe.

Prof. Caldwell, of Cornell University, gives the following as among his observations in Europe: Among the different systems prevalent in Europe, we notice the *Dutch* method in which the milk is cooled down to 60 degrees in a water tank, which requires usually from one and a half to two hours, and the milk is then set to the depth of four or five inches in a room where the temperature ranges from 54 to 60 degrees, and remains about twenty-four hours; the *Holstein* method, in which the milk is set at about the same temperature, without being first cooled in water, to the depth of one and one-half to two and one-half inches; the *Devonshire* method, described as long ago as 1784, where the milk is put in a cool room, standing at a depth not greater than from three to four inches for twelve hours; the vessel containing it is then set over the fire and heated till blisters begin to appear in the cream, or to about 200 degrees, when it is set aside again for twelve hours; the cream is very firm in consistency and can be made into butter by simple kneading, and has a sweet, pleasant taste.

X. Dairy Butter in the West.

Mr. C. C. Buell, one of the best dairyman in the West, describes his method of butter making in the following concise manner: Cows were common stock—Durham grades and sprinkling of Jersey. Fed by running in fresh corn stalks during day time, on Timothy and clover at night; in stable, with two messes of meal daily, consisting, by measure, of two parts corn and one part oats, together with the greater part of the sour milk and buttermilk from the dairy room. Number of cows, forty. The milk was strained through an iron strainer into deep pails, as soon as drawn, standing in open air until the milking was finished. It was then strained again into the same pails through a double thickness cloth strainer. The milk was set in a room without fire, temperature being between 40 and 50 degrees, Fahrenheit. During a part of the time, the temperature being above 50 degrees, the milk was set in water twelve hours. The milk was skimmed after standing twelve to forty-eight hours, it being

considered desirable to mix the newer and older cream, for the sake of flavor; but the whole stood mixed together from two to four hours after the last skimming and during the process of warming to proper temperature for churning. Most of the milk was skimmed a second time, the cream being included in a succeeding churning.

The churn (a dash churn with solid dasher, surface underneath concave), was started at a temperature of 62 degrees; as the buttermilk began to appear a couple of gallons of tolerably strong brine was added at a temperature of 58 degrees, and the churn stopped a moment afterward,—as with the addition of the brine, *at the proper temperature*, the butter separates very rapidly. As much brine as necessary was used in washing down sides of churn, cover and dasher. The butter was then dipped into a bath of not more than two gallons of brine; a churning of forty or fifty pounds being washed in four parts, in the same brine. Removed to a worker with rolling lever; the butter was so handled as to mix with the proper amount of salt with the least working possible. It was then placed in a tub slightly packed, covered with brine and allowed to stand three or four hours, when it was again placed on the worker, lightly worked and packed for market.

XI. How to Color Butter.

Good grass butter needs no coloring. But it has become fashionable, now-a-days, to color all butter that does not come up to the real "grass color;" annotta is the substance used. It is innocent, and is now sold prepared especially for dairymen's use. The quantity to be used must be determined by experiment according to the season. Do not color too high —rather under than over the true yellow of grass butter.

XII. Salting.

Just as the butter is forming in granules in the churn, suddenly reduce the temperature by means of ice water to about 56 degrees. The butter will not then mass together. Wash and take out of the churn and place it on the slab for working, and give it three quarters of an ounce of salt to the pound of butter. This is light salting. One ounce is the usual rule; and one ounce and a quarter to the pound is heavy salting. Use none but the best salt. Remember that salt is not used to preserve the butter, but to bring out its flavor. Never guess at the amount of salt; weigh the butter and then add the proper proportion of salt.

XIII. How to Pack Butter.

Never use any but the best new, clean packages. Let them be uniform in size and appearance; a slovenly package will often condemn the best

butter. The butter being at a temperature of 60 degrees, rub the package, sides and bottom, with salt, put in a quantity of butter not more than you can evenly and firmly press closely to the sides. So continue until the package is filled to within an inch of the top. Lay on a cloth wet with brine and half an inch larger than the package. Work the edges down, and cover with, say, a quarter of an inch of salt; cover this with another cloth. Head up the package and bore a hole through the head; fill up with brine, plug tight. Keep at a low temperature and when it is wanted the butter will be found good.

XIV. Preparing a Package for Use.

Scrub them thoroughly, outside and inside, with a brush and clean hot water. Fill them with pure cold water and let them stand two days. Then scrub again, rinse with cold water, rub thoroughly with salt and they are ready for use. Heart white oak makes the best butter tubs.

XV. Cheese Making—Cheddar Cheese.

The making of Cheddar and Cheshire cheese is described by a celebrated English maker as follows.

Cheddar Cheese.—The morning's and evening's milk are together brought to a temperature of 80 degrees Fahr. If the night has been warm, a temperature of 78 degrees will give as great effectiveness to a given quantity of rennet as one of 82 or 84 degrees would give if the milk had been at a lower temperature for some hours of a cold night. The evening's milk having been placed in shallow vessels during the night to cool, and having been stirred at intervals during the evening, is skimmed in the morning, and the cream with a portion of the milk, is heated up to 100 degrees by floating it in tin vessels on the boiler. The whole of it is then poured through a proper sieve into the tub—into which the morning's milk is being also stirred as it arrives—so as to raise the whole, as I have said, to from 78 to 82 degrees Fahr. This tub may be a large tin vessel, capable of holding 150 gallons, and provided with false bottom and sides, enabling hot or cold water to be passed under and around its contents. The rennet, made from two or three dozen vells, in as many quarts of salt water, and allowed to stand three weeks, is added—half a pint to 100 gallons—and the curd sets in about half an hour. The small vells (rennets) of Irish calves, which are killed at about a week old, are preferred, and they should be eighteen months old before use. The curd is slowly cut with a single long blade to and fro throughout its depth, in lines forming a 4-inch mesh upon the surface, and the whole mass is gently turned over from the bottom with a skimming dish and the hand.

The whole is then again worked throughout with a "shovel breaker," a four-fingered paddle with wires across the fingers—great care being taken to do it gently, so that the whey shall not become too white. The curd is thus broken up into pieces not much larger than peas, and at least half an hour is taken in the process. Hot water is then let into the space around and below the cheese tub, and the whole is raised to 100 deg. Fahr.; and this, too, is done gradually, so as to raise the whole by degrees, not heating any portion to excess. This also takes half an hour. The hot water is then drawn off, and the curd is stirred by the hand and a skimming dish for another half hour in the midst of its hot whey, being at last reduced to a mass of separate bits the size of small peas. The whey, after settling for half an hour, is then removed—ladled, syphoned, or drawn—to its vat, where it stands about six inches deep, and is skimmed next day, yielding a butter which should not exceed in quantity six to eight ounces per cow per week.

The curd stands half an hour after the whey is drawn off, and it is then cut in four or five pieces, turned over and left for half an hour, after which it is again cut and left for a quarter of an hour. After this, it should be in the slightest degree acid to the taste. If allowed to become too acid, it will not press into a solid, well-shaped cheese, but will be apt to sink broad misshapen. It is now torn into pieces by hand and left to cool; and thereafter it is packed in successive thin layers in the vat—a cylindrical or wooden vessel twelve inches or more wide and twelve inches deep—whence, after being pressed for half an hour, it is taken out (it is then probably midday,) and broken up by hand, and allowed again to cool. Then, when cool, and hard, and sour, and dry, and tough enough, (all this, of course, being left to the judgment of the maker), it is ground up in the curd mill; two pounds of salt are added to the cwt. of curd, and the whole is allowed to cool, and as soon as cold, it is put in the vat, and taken to press. It is then probably 3 p. m. The pressure on the cheese may be 18 cwt. The cloth is changed next morning. A calico coating is laced on it the second day, and the third day the cheese may be taken from the press, placed in the cheese room, bandaged, and turned daily, and afterwards less frequently. The cheese room should be kept at nearly 65 degrees Fahr. The cheese will not be ready for sale for three months. The process of making Cheddar cheese lasts all day, and the cheeses are made of various sizes, generally twelve inches wide and a foot high, but sometimes larger in both dimensions, and from 70 to 100 pounds in weight; the object being to make all the milk of one day on a farm of thirty to forty cows into a single cheese.

XVI. Cheshire Cheese.

Cheshire cheese, like the Cheddar, is made only once a day. The evening's milk is placed, not more than six to seven inches deep, in tin vessels to cool during the night, on the floor of the dairy; it is skimmed in the morning, and a certain portion is kept for butter—in early Summer, only enough, perhaps, for the use of the house, but in Autumn more, and in some dairies at least, nearly all the morning's cream is thus taken for churning. The skimmed cream, with a portion of milk, is heated up to 130 deg. Fahr. by floating the tins which hold it, on the boiler—sufficient quantity being taken to raise the whole of the evening's and morning's milk together to 90 deg. or thereabouts. The rennet is made the day before it is used; 12 or 14 square inches of "vell" (rennet skin) standing in a pint of salt water, kept in a warm place, making rennet enough for 100 gallons of milk. The Irish vell (rennet skin) is used, as it is obtained from very young and milk-fed calves.

The curd is set about 50 minutes; it is then cut with the usual curd-breaker, a sieve-shaped cutter, very slowly. The whey is syphoned, pumped, or lifted out as soon as possible; but before it is all removed a portion is (on some farms where the Cheddar system is followed), heated and returned to the tub, and the curd is left in this hot whey for half an hour. The whey is then drained away and the curd is left to get firm. When firm enough to stand on the hand in cubes of about a pound weight —this is an intelligent indication—without breaking asunder, it is lifted out on the drainer (a false bottom of rods), in a long tub with a stop-cock to it, and there left covered up for 45 minutes, after which it is broken up and well mixed with the hand with 3 1-2 to 4 1-2 lbs. of salt per cwt. It is then allowed to stand with a light weight upon it for about three-quarters of an hour longer, and is turned over once or twice during the time, being cut for the purpose into squares with a knife. It is then twice passed through the curd mill, and at length put into the vat, a cloth being first pressed into place by a tin hoop, and the salted curd being packed gently by hand within it. The vats will hold a cheese of 70 or 80 up to 100 lbs; and tin hoops, placed within them, are used to eke them out, and give capacity for a larger quantity of curd if necessary. After standing in the vat, with a weight upon it, from one to two hours, according to the weather, it is turned over and put, still in its vat, into the oven,—a warm chamber in or near the brickwork of the dairy chimney—where it remains at a temperature of 90 deg. to 100 deg. during the night. Both when in the press and here the cheese is skewered, skewers being thrust into it through holes in the vat and every now and then withdrawn, so as to facilitate the drainage of the whey. The cheese is taken out of the

vat in the morning and turned upside down in a fresh cloth. It is in the press three days, and it is turned in the press twice a day, being dry-clothed each time. It is then taken out dry-clothed, bandaged, and removed to the cheese room, where it is turned daily, and at length only occasionally, until it is ready for sale. In some dairies all skewering is dispensed with, and no pressure is used at the time of making, nor for two days afterwards, but the whey is allowed to run out of its own accord. Cheese manufactured in this way requires from 5 to 7 days in drying, but afterwards matures more quickly for market.

The cheese varies considerably in quality throughout the year, the earlier make of March and April being considerably less valuable than that of Summer and early Autumn. Some of this varying quality is owing to the quality of the milk, the cows being house-fed; but more of it is, in all probability, owing to the necessity of holding a portion of curd over from day to day, when the quantity is insufficient to make even one, or it may be two, full-sized cheeses daily. In such cases it is common to make one full-sized cheese, and hold the remainder of the curd over till the next day, keeping it wrapped up on the drainer or pan, and grinding it up in the curd-mill along with the curd of the next morning.

XVII. How to Prepare Rennets.

Rennet is a preparation of the membrane of the stomach of grass eating animals, taken at an age so young that they have taken no nourishment except the milk of the dam. In its broad sense it is an infusion of animal membrane. The stomachs of pigs are sometimes used, but those of calves are the best. Taken when the calf is from two to six weeks old they are better than when taken at any other time.

They are now an article of commerce, and are regularly kept by dealers. They may be prepared by the following directions, with or without spices, as the fancy may dictate: Rennet never should be taken from the calf till the excrement shows the animal to be in perfect health. It should be emptied of its contents, salted and dried, without scraping or rinsing, and kept dry for one year, when it will be fit for use. It should not be allowed to gather dampness, or its strength will evaporate. To prepare it for use, into ten gallons of water (blood warm) put ten rennets, churn or rub them often for twenty-four hours, then rub and press them to get the strength; stretch, salt and dry them as before. They will gain strength for a second use, and may be used when the weather will admit of soaking them to get the full strength. Make the liquor as salt as can be made, strain and settle it, separate it from sediment, (if any,) and it is fit for use. Six lemons, two ounces of cloves, two ounces of cinnamon, and two ounces of common sage are sometimes added to the liquor to

preserve its flavor and quicken its action. If kept cool in a stone jar, it will keep sweet any length of time desired, and a uniform strength can be secured while it lasts. Stir it before dipping off to set milk; take enough of it to curdle milk firm in forty minutes.

The ordinary way of saving the rennets, however, is as follows: The rennets should be taken out immediately after the animal is killed, turned inside out without washing, thoroughly cured with dairy salt, perfectly dried, and then kept in strong paper sacks until wanted for use. For use, the rennets should be soaked in clean whey, saturated with salt for twenty-four hours before using, frequently squeezing them with the hand, that they may become thoroughly macerated. After being soaked, the liquor should be kept as cold as possible without freezing, and in tight vessels.

PART IV.

Diseases of Cattle.

HOW TO KNOW THEM; THEIR CAUSES, PREVENTION AND CURE.

DISEASES OF CATTLE.

CHAPTER I.

GENERAL PRINCIPLES.

I. IMPORTANCE OF THIS DEPARTMENT OF PRACTICE.——II. PATHOLOGY OF CATTLE AND OF THE HORSE COMPARED.——III. ACTION OF REMEDIES IN CATTLE.——IV. THE ONLY SAFE PRINCIPLES FOR MOST CATTLE OWNERS.——V. FAMILIARIZE YOURSELF WITH THE PHENOMENA OF HEALTH.——VI. THE PULSE, RESPIRATION AND TEMPERATURE.——VII. OTHER SPECIAL SIGNS OF DISEASE.

As cattle occupy a foremost place in the wealth and resources of the country, furnishing its beef, milk, butter and cheese, and, as secondary products, its hides, tallow, glue, animal charcoal, etc., the prevention of disease among them—especially, of contagious diseases—and their treatment when sick, become very important, not only from a financial standpoint, but also from considerations of the public health and comfort.

II. Pathology of Cattle and of the Horse Compared.

Cattle are a phlegmatic, plethoric race of animals, intended by nature to eat large quantities of bulky food, to be digested lying down and by the process of rumination, and to take but little exercise. This fat, plethoric condition of the system renders them more susceptible to certain classes of diseases than the horse, especially to the blood poisons, that with them are so rapidly and certainly fatal, such as rinderpest, anthrax, variola, etc. On the other hand, their nervous organization being much less sensitive, they are not nearly so liable to attacks of such disorders as tetanus, paralysis, etc.

Cattle not being fed to produce muscle without fat, are not subject to lameness and disease of the air-passages to the same extent as the horse, with whom speed and endurance are the main points. In fact, soundness or unsoundness, as the terms are used by horsemen, is of little importance to the cattle owner, so long as the animal can move with any degree of comfort at all; while such affections of the wind-passages as roaring, whistling and heaves are to him unknown. Still, that distressing, incurable disease, so common in the human race, pulmonary consumption,

is very prevalent among certain classes of cattle, as a result of too much in-and-in breeding, or of overfeeding and forcing on highly stimulating diet.

On account of their lower grade of vitality, they are more susceptible to influences that develop local diseases, as, for example, the miasma of low, marshy ground, especially that which has been overflowed; and also to poor fodder, from must, or being affected with ergot, etc.

There is a peculiar sympathy in disease among cattle, as is illustrated in regard to abortion. It is a familiar experience that if one cow aborts through accident, one or more of the others will abort through sympathy.

Owing to their natural tendency to plethora, cattle seem peculiarly predisposed to malignant ulcers, swellings, glandular enlargements and even gangrene. To these they are more subject than any other of the domestic animals.

The nostrils, pharynx, larynx and trachea (wind-pipe) are much smaller than in the horse, which is one reason why they cannot travel so fast nor so long as the latter,—the wind fails. This also explains why suffocation is a more imminent danger in cases of throat inflammation in cattle than in horses, needing specially prompt and active treatment, even to the operation of tracheotomy.

The different arrangement of the digestive apparatus in cattle as compared with the horse, is very marked, the former having four distinct stomachs, while the latter has only one stomach, but a greater length of intestines, which are also much more sensitive. Inflammation of the bowels, so common with the horse, is quite rare with the ox.

Cattle are less tolerant of disease and pain than the horse. They give up in discouragement, after one or two attempts, and pine away under pain very fast. They soon become indifferent to life, often refusing to make one effort to rise when perfectly able to do so; and, as weakness follows more rapidly in inflammatory diseases, these require more energetic measures and an earlier administration of tonics and stimulants than when treating the horse.

III. Action of Remedies in Cattle.

Remembering the phlegmatic nature of cattle, remedies work very differently with them than with the horse. Medicines should always be given them in liquid form, and more bulky than for the horse; and they should contain something in the nature of a mild stimulant to hasten their passage through the first three stomachs, and on to the fourth stomach and intestines, where they can be taken up into the system by the absorbents.

Aloes, though so excellent a purgative for horses, is of no use with cattle; while epsom salts, that are so drastic and cold for horses, on cattle work like a charm. Calomel and other forms of mercury act violently on cattle, salivating them very soon, and is excreted through the milk, often affecting sucking calves seriously. Oils, used as purgatives, act well on cattle, and especially melted lard. Mustard, as a blister, acts with more vigor on cattle than on the horse, but turpentine less.

IV. The Only Safe Principles for Most Cattle Owners.

But few outside of the more common diseases of cattle will be treated of in this work, the better to adapt it for its ready use, as a book for reference, by the average stock owner; and the recipes will be as few and simple as they can be made without detracting from their value. It is a mistake to suppose that any great variety of violent drugs can be used with advantage by the public generally. The public would, no doubt, learn by experience, but it would be at the cost of losing many valuable animals. What we advocate and would like to instil into the minds of our readers, in conjunction with the importance of thorough preventive measures, is to treat the ordinary diseases as early and vigorously as possible, with the simplest efficient remedies, and when any extraordinary case arises requiring more violent means, to employ an educated, well qualified veterinary surgeon.

V. Familiarize Yourself with the Phenomena of Health.

As it is obvious that no person is fitted to treat disease who is unable to distinguish at least its prominent symptoms, every stock owner should familiarize himself with the ordinary phenomena of health, especially with the pulse, respiration and temperature. Scarcely less important than these, in many forms of disease, are the appearance of the hair and skin, and that of the eye; the posture and movements; and the character and frequency of the appetite, and also of the discharges.

VI. The Pulse, Respiration and Temperature.

The normal pulse in cattle ranges from fifty to fifty-five per minute; in old animals, but especially in calves, it is somewhat more. The pulse is the most conveniently taken from the artery passing over the middle of the first rib, or else that beneath the tail. In health it is softer and less tense than it is in the horse.

The breathing it requires no special skill to diagnose—only a moderate amount of practice. The soft, rustling sound of the healthful "respiratory murmur," when the ear is placed to the chest, is altogether changed when there is any ailment affecting the lungs or air passages. The number of respirations per minute (ordinarily ten to fifteen in cattle) can be

easily counted by the heaving of the chest. Some practice, however, will be required to make one a first-rate judge of the sound obtained by percussion, which, in health, is always clear and resonant. Percussion consists in placing the forefinger of the left hand upon the chest, and striking it smartly with the ends of the first three fingers of the right hand.

The temperature, in all animals, is a vital index of unsurpassed value. It can be approximately measured by feeling the skin, ears and legs,—in cattle the horns also, at their root. But what is termed the "clinical thermometer," which is so shaped that its bulb can be conveniently inserted into the rectum, (to remain two or three minutes), is infinitely better, as it gives results so much more exact. Its use has established the important fact that different febrile diseases have different ranges of temperature, each having its own "dead-line," beyond which recovery is impossible. Thus, a horse with cerebro-spinal meningitis will certainly die soon after reaching a temperature of 104° ; yet 108° or even 109° by no means indicate a fatal termination, in a case of pneumonia.

VII. Other Special Signs of Disease.

A "staring coat," as it is termed, in which the hairs stand out like bristles, is an obvious symptom, and sometimes the only one, of a low state of health. Shivering, when the animal is exposed to only moderate cold or to none at all, challenges immediate attention ; for it is, infallibly, the ushering in of an attack of some disease, usually severe. Cold sweat coming out on the skin of an animal severely ill indicates a desperate, if not fatal, condition. The posture when standing, the method of lying down or getting up, the action in moving around,—these are all significant, and should be noted carefully.

The countenance, and especially the eye, if observed closely, will betray the distress and pain which the dumb sufferer cannot express in words. The muzzle, which in health is moist, (or covered with "dew," as many call it), in disease, especially in fever, becomes unnaturally hot and dry or cold, and sometimes changed in color—sometimes paler, but more commonly injected with blood. One of the earliest signs of serious constitutional disturbance, as well as of certain special disorders, in the case of cattle, is the suspension of rumination,—that is, ceasing to chew the cud. A nearly coincident general symptom, in cows, is the drying up of the milk.

CHAPTER II.

CONTAGIOUS DISEASES.

I. CONTAGIOUS PLEURO-PNEUMONIA.——II. RINDERPEST OR CATTLE PLAGUE.——III. TEXAS FEVER, SPANISH OR SPLENIC FEVER.——IV. CONTAGIOUS ECZEMA, FOOT AND MOUTH DISEASE OR EPIZOOTIC APHTHA.——V. ANTHRAX.——VI. VARIOLA VACCINÆ OR COW-POX.

I. Contagious Pleuro-Pneumonia.

This is the most fatal and contagious of the diseases to which cattle are subject, except rinderpest, (a contagious enteric fever), which has never yet gotten a hold in America, and Texas or Spanish fever, (splenic fever). It is still successfully confined to the region in which it was first introduced, viz: The region contiguous to New York city, and portions of New Jersey, Pennsylvania, Delaware and Maryland. It is, in fact, now restricted to comparatively narrow limits, and it is to be hoped that the strict measures taken to prevent its spread will keep it confined entirely to that portion of the country east of the Allegheny mountains.

It is a contagious fever of cattle, with local inflammation of the pleura, (the thin membrane lining the thorax and investing the lungs), accompanied by great prostration, and in its more malignant forms ending in death in a few days. It is, however, often slow in its development, weeks, or even months elapsing during which the contagion works in the system, before finally revealing its fatal symptoms.

So terribly contagious is this disease that but little assurance can be given that any known remedy will prove valuable, since in the attempt to cure one animal, the whole herd may be attacked. Hence, the farmer suspecting it in his herd should at once apply to a competent veterinary surgeon, if there is one within reach, to verify the disease. If such expert authority be not at hand, kill the animal or animals at once, slash the skin to prevent any person from digging the animal up for the sake of the hide, and bury deeply; if quick lime can be gotten, use it freely

over the carcass. Then disinfect carefully all stables and outhouses, and in case other animals are suspected, isolate and quarantine them and await developments.

PLEURO-PNEUMONIA.

Section of affected lung in contagious pleuro-pneumonia. The thin end shows black hepatization; the center, red. At the thick end interlobular infiltration and several blocked vessels are shown.

How to know it.—The earlier symptoms are apt to pass unnoticed. The first is a rise in temperature to 103° or 106° F., shown by introducing a clinical thermometer into the rectum, the average temperature being 101°; there will be loss of appetite; a staring coat; slight shiverings; a hard, dry cough; a loss of milk; scanty urine, higher or darker colored than usual. Then will follow tenderness upon pressure between the ribs over the lungs; the cough will increase; and the breathing quicken; the nose will extend; the back be arched; the hind legs will be drawn under the body, and the elbows will be turned out. Later, there will be a watery or a more pronounced discharge of matter from the eyes and nose; obstinate constipation, or a watery fœtid diarrhœa; a rapid weakening of the system, ending in death.

Upon percussion (striking) over the lungs, there will be given back, in the earlier stages, a clear, resonant sound; later, it will be dull and heavy. So, in the first stage, there will be a dry, crackling sound; later, it will be a whistling or rough breathing sound. Any of these may be easily distinguished from the sound occasioned by percussion upon an animal in health.

In America pleuro-pneumonia does not show the most violent symptoms except in warm weather. Yet this very slow incubation shows the extreme care that should be exercised in watchfulness. The seeds of the disease once in the system, the incubation is only a question of time, and warm weather will bring out the disease in all its intensity.

What to do.—As to remedial measures, it seems useless for the farmer to resort to them, since this is a disease that the veterinarian alone can cope with, and then only when perfect isolation may be had. The safest

and also the cheapest plan, is prompt killing and burial of infected animals, thorough isolation of the rest of the herd, and perfect disinfection. In the matter of disinfection, the easiest, cheapest and best way is to remove all animals from the barn or shed, and close it up tightly and burn sulphur in it for a couple of hours; then open and air it, and whitewash it thoroughly with lime.

Prevention.—Proper quarantine of stock imported into this country, for a period of time sufficiently long to decide for a certainty, that no latent contagion is hanging around them, say two months; destruction of all affected animals; and isolation of those that have been exposed to the contagion. Some very high authorities in Europe recommend inoculation of those that have been exposed, and even of whole herds and dairies. It is a disease, the occurrence of which in an animal once, confers immunity from subsequent attacks. It is found that inoculation does not always produce the same disease, at least the disease produced by inoculation is not always located in the same place, but the constitutional effect is produced with the same result of immunity from subsequent attacks as the original disease; and the proportion of deaths among inoculated animals is small as compared with those who take the disease in its regular course.

The conclusions arrived at by the Belgian Commission in regard to inoculation, as stated by Prof. Gamgee, are as follows:

"1. The inoculation of the liquid extracted from the lungs of an animal affected with pleuro-pneumonia does not transmit to healthy animals of the same species the same disease, at all events so far as its seat is concerned. 2. The appreciable phenomena which follow the inoculation are those of local inflammation, which is circumscribed and slight on a certain number of animals inoculated; extensive and diffuse, with general reaction proportioned to the local disease, and complicated by gangrenous accidents on another number of inoculated animals, so that even death may result. 3. The inoculation of the liquid from the lungs of an animal affected with pleuro-pneumonia exerts a preservative influence, and invests the economy of the larger number of animals subjected to its influence with an immunity which protects them from the contagion of this malady, during a period which has yet to be determined."

The losses sustained during the experiments of the Commission amounted to 11.11 per cent. The number of animals on which the effect of inoculation was benignant, was 61.11 per cent.; the proportion in which there was gangrene and loss of a portion of the tail, 27.77 per cent.; in twenty-one subjects the inflammation was very severe, and complicated by gangrenous phenomena, causing the death of six; and, lastly, the recoveries amounted to 88.88 per cent.

The place recommended to insert the virus is on the end of the tail, it being less liable to work violently, and terminate fatally from gangrene, when inserted there than at any other part.

II. Rinderpest, or Contagious Enteric Fever.

General Description.—Whatever may be said to the contrary, this terrible plague has never yet been introduced into any of the countries of the American hemisphere. At least, there is no well authenticated record of any case. Its ravages have been mostly confined to the herds of Europe and Asia, and especially to those of the southern portion of European Russia and adjacent districts. It is devoutly to be hoped it never will find its way to America, for it is terribly contagious, desperately fatal, and swift in its work of death. Where it originally started is not known. In Southern Russia, on the Asiatic steppes, in various parts of India, in Southern and Southwestern China, Cochin China, in Mongolia, Burmah, Hindostan, Persia, Thibet and Ceylon, it has long been known, and has been carried thence to various European States.

The principle of contagion has not yet been discovered, but when once an animal is affected, it extends to every tissue and secretion. It is, however, mostly contained in the secretions of the mucous membranes, and healthy animals will be infected by coming near infected animals, or near anything contaminated by their secretions and exhalations, and without actual contact. So, any object may be infected, and carry the disease indefinitely, as clothing, wool, hay, straw, litter, wood-work, for it may remain latent in any of these objects for a long time. Fortunately, air is said to be the most potent and effective means of destroying the virus; and hence, thorough aeration by a direct and continuous current of air is one of the best ways of diluting, and at length destroying, the seeds of this dread disease.

So quick is the development of the disease that death sometimes occurs after the second day, though usually after the fifth day; and an average of from seventy to eighty per cent. of the animals attacked die. Goats, sheep and deer are also attacked, and the probability is that all ruminating animals are subject to the contagion; but sheep and goats are not liable to so large a percentage of mortality as are neat cattle.

Many of the symptoms of rinderpest occur in pleuro-pneumonia in its contagious form; also, in malignant catarrhal fever, and in foot-and-mouth disease. But pleuro-pneumonia is distinguished from rinderpest by the absence of the characteristic eruptions upon the mucous membranes. Malignant catarrhal fever is distinguished therefrom by the dimness of the transparent cornea of the eye, which in rinderpest

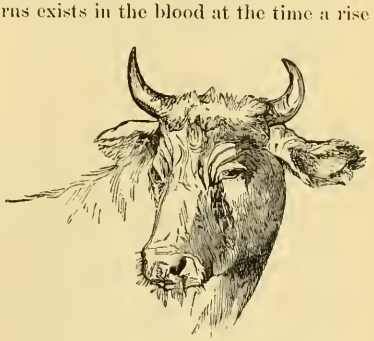
remains clear. The foot-and-mouth disease differs from rinderpest by ulceration of the feet, and the less degree of fever.

The alteration of the mucous membrane in rinderpest, heretofore spoken of, may very soon be observed in the vagina of cows, which becomes spotted or striped with red, and, in about twenty-four hours after, small yellowish white or gray specks are clearly distinguished on the red spots and stripes. These are formed by the loosening of the cuticle, which may be rubbed off, leaving in its place a dark red depression.

There is no known remedy for this disease, and hence the only security against its spread is in the enactment of the most stringent laws, first, for its prevention; second, for its extinction, by isolation of all suspected animals, and the prompt killing and burial of all infected ones. In this respect the laws of the German Empire are the most perfect, and our State and general governments might take a lesson therefrom, in dealing with pleuro-pneumonia and other malignant contagious diseases of animals, if the machinery of politics could be successfully dissociated from the appointment of officers for the investigations sought.

When an animal has this disease, and recovers, he is rendered insusceptible to another attack.

How to know it.—A perceptible rise in the temperature of the body occurs about two days before any other symptoms present themselves; and it has been shown that the virus exists in the blood at the time a rise in temperature is first noticed. Inoculation with serum of the blood taken from an animal at this time, will produce the disease. The temperature in the course of two days rises to 104° or 105° F., when the following symptoms will be noticed: Shivering; muscular twitching; restlessness; colicky pains; sometimes a husky cough; yawning; great dulness, with drooping of the ears; occasional fits of delirium; the appetite is soon lost; the milk of cows is suddenly and entirely stopped, more so than in any other disease. In the later stages, the animal grinds its teeth; arches its back; draws its legs together; moans and grunts with each expiration, at which time the breath is held for an instant and then expelled with a grunt. At first the bowels are constipated, but this



RINDERPEST.

condition is soon followed by violent purging; the dry, hot, red condition of the eyes, nose and mouth, which exist in the early stage, is followed by a discharge of a glairy, watery character, soon running into an opaque and turbid form, which is very typical of the disease. In some cases the visible mucous membranes become altered in appearance, by assuming a salmon-red appearance over the whole extent, with deep crimson red patches dotted over the surface. When lying down, the head is usually turned upon the upper flank; the twitching of the muscles will be noticed more about the neck, shoulders and hind quarters. The discharges from the bowels are at first black, but soon change to a pale greenish brown; they are very fœtid and are voided with much straining. The urine is scanty and high colored, and sometimes albuminous. The pulse rises to 120° to 140° per minute; the surface of the body gets deathly cold; weakness increases, the animal lying most of the time; the areolar tissue becomes, in most cases, bloated with air; the animal becomes drowsy, and soon after unconciousness sets in; the nostrils flap; the mucous membranes become lead-colored, with purple patches; flatulence supervenes, with involuntary evacuation of feces, and death soon follows.

Sometimes the eruption covers the entire body, and, again, it may be wholly wanting.

III. Texas Fever, Spanish or Splenic Fever.

This disease, which has its origin in the low lands of Mexico and Texas, more nearly resembles the rinderpest of Asiatic Russia than any other. It is, however, not nearly so destructive; is not communicated from one field to another; the germs are surely killed by the first frost, and are only communicated to Northern cattle by the Texas cattle driven overland infecting other cattle passing along the same road or feeding ground. The animals taking it in this way do not communicate it to others, and hence the probability that its malignant, contagious form is not ripened in climates in which frosts occur. Hence, again, in all those districts where Texas cattle are not permitted to pasture there is no danger of the disease breaking out. It was noticed in Missouri as long ago as 1849, through the introduction of Texas cattle, and continued to increase in that region until, in 1858, the trade in Texas cattle having become very large, the Legislature of Kansas attempted to stay its ravages by restrictive enactments. In 1868, through the importation of Texas cattle, and their carriage by railway, the loss to native stock in the grazing States east of the Mississippi became so great, especially in Illinois, Indiana, and Ohio, that the most stringent measures were taken by the Legislatures of various States to prevent such cattle from being brought in. These

measures operated successfully, since of late years but little trouble has been experienced. The disease is not communicated after frosty weather sets in, and Texas cattle wintered in the North do not communicate the disease the following summer.

Incubation.—The stage of incubation is from four to five weeks. The blood undergoes a material change, and some of its elements escape into the various tissues of the body and into the urine, giving the latter a bloody appearance.

How to know it.—As in pleuro-pneumonia, a marked symptom is an increase of heat, to 104° to 106°; the pulse rises from 40 beats a minute (the average for healthy steers) up to 120 a minute. The fever is generally preceded by a chill; the dung and urine become scanty, high colored, or bloody; the milk fails rapidly; yellow matter is discharged from the nostrils and mouth; the animal assumes a peculiarly dejected look; the back is arched; the flanks become hollow; the gait unsteady or staggering, and the hair rough; the cough is more or less frequent; the urine coagulates on boiling; the mucous membranes are deep yellow or brown color, and that of the rectum dark red. There is but little trace of disease in the first three stomachs, but the fourth stomach shows congestion, and the intestines are still more gorged and blood-stained. The liver is not seriously affected, but the gall bladder is filled with thick, dark colored bile; the kidneys are also congested, and the secretion in the bladder is bloody or blood-stained; the spleen is much affected and enlarged. In a healthy animal the spleen should weigh a pound or a pound and a half; in cattle dying of Texas fever it has been known to reach a weight of eight pounds; hence, the specific name of splenic fever.

What to do.—Treatment for this disease, like that for pleuro-pneumonia and rinderpest, is not satisfactory in the majority of cases. There is this point, however, in the treatment—since cattle infested from Texans do not give it to others, and since isolation is a security against contagion, the animals should at once be put into confortable quarters and receive good nursing.

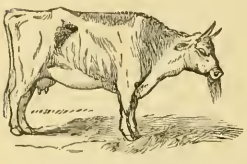
IV. Contagious Eczema, Foot and Mouth Disease, or Epizoötic Aphtha.

This disease is unknown in America, but it is very common in the older countries. Owing to its very short period of incubation—twenty-four hours to three or four days—there is very little danger of its importation; and quarantining any affected herds before allowing them to land, will effectually prevent its introduction.

It as an eczematous or skin disease affecting the mouth, tongue, lips, feet, legs and udder. The contagion lies in the discharges from the

mouth and feet, and the virus is strewn along the road and over the pastures by the droppings from the mouth, and the matter running from the feet, and is conveyed from field to field by small vermin, dogs, cats, etc.

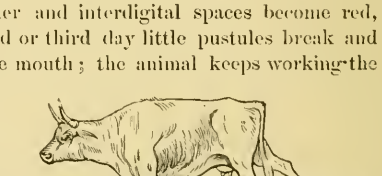
It is contagious to nearly all the lower animals and to man. It is not often fatal, but it causes much loss to the stock owner, through the loss of flesh in cattle that are being fattened, and the failure in milk, the supply being lessened by from one to two-thirds of the usual yield.



EPIZOOTIC APHTHA OR FOOT AND MOUTH DISEASE.

The milk is affected not only in quantity, but contains much of the poison of the disease, and affects young animals to which it is given warm, causing cramps, violent diarrhœa, intestinal irritation, which often prove fatal. It is considered by good authorities to be equally injurious to infants. By the aid of the microscope vibriones, bacteria and monads are found, which appear to be more injurious to the consumer when the milk is drank warm, fresh from the cow. Some authorities say to boil it before using, and others that this makes no difference, but it is certainly less injurious when it has stood a few hours and got thoroughly cold.

How to know it.—The usual symptoms are rough, staring coat; shivering fits, dry, hot mouth and muzzle; pulse and temperature raised; the mouth, tongue, lips, teats, udder and interdigital spaces become red, swollen and sore; on the second or third day little pustules break and discharge; saliva drools from the mouth; the animal keeps working the tongue in great uneasiness; lameness in the feet is seen, the fever in them being sometimes such as to cause the hoofs to drop off, the joints to become opened, and extensive sloughing to take place. There is great inclination to lie down. The greatest damage to the feet is seen among sheep and swine. The latter sometimes lose some of the digital bones.



EPIZOOTIC APHTHA.

Indications of the feet being affected.

What to do.—The treatment is of little consequence, as the disease runs a definite course, and usually terminates in recovery in about fifteen days. Give soft food to eat and a bountiful supply of clear cold water to drink; an ounce of saltpeter dissolved in each pail is an advantage. Pay the most attention to the feet, wash them clean and remove any

horn that may be detached; if the inflammation and swelling are great, apply a linseed poultice till there are raw surfaces, then change them to the following lotion:

No. 1.
1 Ounce sugar of lead,
2 Drachms carbolic acid,
1 Ounce laudanum,
Water to make one pint,
Mix.

Apply three times a day. When suppuration ceases, bind the feet up in tar bandages. If great weakness follows, with prostration and loss of appetite, give whiskey, brandy, etc., in oatmeal gruel. Give no purgatives, not even a laxative; for the bowels, although constipated at first, soon become loose and should not be interfered with, as that is one of the efforts of nature to expel the poison from the system; and never bleed. If extensive sloughing around the feet takes place, apply the following lotion:

No. 2.
One part carbolic acid.
Eight parts olive oil.
Mix.

Apply three times a day.

V. Anthrax.

This is known by many different names, according to the part attacked, and the impression made upon the mind of the person describing it—*Black Leg*, *Black Quarter*, *Quarter Ill*, *Charbon*, *Chancre a la Langue*, *Sang de Rate*, *Mal de Sary*, *Splenic Apoplexy and Broxy in Sheep*, *Bloody Murrain*, *etc.* Under the above names are included a group of diseases very virulent, malignant and contagious, appearing under different forms, externally and internally, and attacking the different species of lower animals and man, in an epizoötic, enzoötic or sporadic manner, according to the influences that produce it, or whether it is got by inoculation. It arises spontaneously in low, damp, rich pastures, and along the banks of overflowed rivers, or where ponds have been drained off or dried up, the soil containing a great amount of organic matter, and when cattle are fattened too fast, by feeding on rich, succulent food, especially clover. Long continued, warm, dry weather, favoring the emanations of organic matter and miasmatic gases, with great changes in temperature between day and night, especially in a still atmosphere, favor its development.

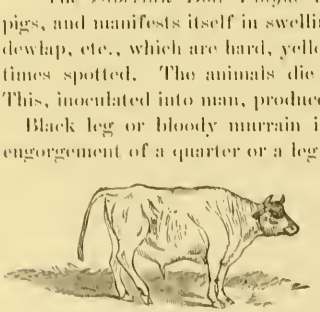
The main characteristic of the disease is black, tarry blood, that will not coagulate, and containing rod-like bodies (*bacteria*); and shortly before death, spores develop, which are the active part of the virus in inoculation.

Blood containing these spores has been dried, reduced to dust, and kept four years, and found to be as active as ever in producing the fatal disease. (Koch.) The spores do not continue to increase after death, and are not found in any great quantity. The rods are found in greatest quantity in the spleen. The spleen, liver and lymphatic glands enlarge and become soft. The bloody flux may locate in any part of the body, with the tendency to gangrene, death and decomposition of the part affected, and the formation of gases that distend the tissues, making a crackling noise when the hand is passed over it. When it commences on one point of the surface, a small blister forms, gathers, breaks and dries up, and others form around it, and so on in consecutive rings it spreads. This constitutes malignant pustule, and is the form it usually takes in man, got by inoculation, from handling carcasses and skinning animals dead from anthrax, handling dirty rags, etc.

Anthrax has two distinct ways of manifesting itself, with external lesions and without them. To the former belong the black leg, black quarter, or bloody murrain, black tongue, Siberian boil plague, and carbuncular erysipelas of sheep and swine, and malignant sore throat of the latter; to the latter, all those having specific changes in the blood, with engorgement of the spleen, exudations and blood-stained spots in the internal organs, and sudden death.

The *Siberian Boil Plague* attacks horses, cattle, sheep, goats and pigs, and manifests itself in swellings on the sheath, udder, throat, breast, dewlap, etc., which are hard, yellowish, and streaked with red, and sometimes spotted. The animals die in from twelve to twenty-four hours. This, inoculated into man, produces malignant pustule, or charbon.

Black leg or bloody murrain is malignant anthrax, characterized by engorgement of a quarter or a leg, shoulder or a side. It usually occurs among young, fast growing, thriving cattle, and is so sudden in its attack, short in its duration, and fatal in its effect, that one or two of a herd may be found dead in the morning, when nothing whatever was wrong with them the night before. There is a stiffness in the affected quarter, with some diffuse swelling and heat, fever, and an appearance of plethora; the swollen quarter soon mortifies, becomes cold, gas forms under the skin and crackles if rubbed, and death soon follows. Sometimes there is an effusion of yellow looking lymph from the swelling. Recovery is very rare, and is slow and tedious, and the swelling is apt to slough extensively and form sluggish, unsightly sores.



CARBUNCULAR ERYSIPELAS—BLACK LEG OR QUARTER ILL.

The black tongue is seen in cattle, and sometimes in horses, and is known by red purple or black blisters on the tongue, palate and cheeks, sometimes attaining the size of a hen's egg; they burst and run an ichorous, scalding matter, and the sore becomes unhealthy and ulcer-like, with more or less swelling; the discharge, as it runs from the mouth, is bloody; the fever runs very high, the system becomes poisoned throughout, and death ensues in twenty to forty-eight hours.

GLOSS-ANTHRAX OR BLACK TONGUE.

Carbuncular erysipelas in sheep corresponds to black leg in cattle, and, like it, always attacks the finest, fattest and most thriving one in the flock. The symptoms are the same as black leg, and death follows in from ten to sixty hours.

Swine have the carbuncular erysipelas the same as sheep; also, black tongue, tumors about the throat, and pharyngeal anthrax; the latter is the most common form, and is probably caused by eating the carcass of some anthrax animal. There is fever, swelling about the throat, neck and breast, which is red, shining, tender, and soon becomes purple, cold and insensible, and pits upon pressure; nausea, vomiting, retching and loss of appetite; purple patches form around the eyes and on the snout; breathing becomes difficult, and the mouth livid; the temperature falls, and death follows in from one to two days.

Dogs, cats and other small animals die from anthrax, developed in the same manner as it is in pigs, and coming from their eating anthrax carcasses. They are affected in the mouth, throat and digestive organs, giving rise to vomiting, fever and death.

Birds and poultry die of anthrax, from eating bits of anthrax victims. It developes in them in fever and swelling on the head, comb, breast and feet.

In man, malignant pustule or charbon developes by inoculation; a small red spot shows itself with itching, and increases in size. In the course of twelve hours, a blister forms, breaks, dries, and a new crop springs up around the old one, and so it spreads. The affected parts run through all the shades of color from red to black, when gangrene sets in, and sloughs in case of recovery, but, alas, it is too often fatal, the same as in the lower animals.

Anthrax without external swelling is known as anthrax fever, splenic apoplexy, broxy, etc., according to the animals attacked. Horses, cattle,

sheep, swine and fowls are liable to attacks of anthrax fever. This is characterized by high fever, plethora, engorgement of the spleen and other internal organs, and colicky pain; redness, and often purple spots, are seen on the mucous membranes; bloody, frothy mucus comes from the nose and eyes; the dung is streaked with blood; great weakness follows, and death in twelve to twenty-four hours.

What to do.—Treatment is of no avail in the first cases, owing to the rapid fatality of the disease, but in subsequent cases, when the patient can bear it, bleed freely, then give purgatives. Of Epsom salt, give a pound to cattle when full grown; calves, three or four ounces, and young cattle in proportion; sheep and pigs, four to six ounces. Horses may have two ounces, or Barbadoes aloes, five to seven drachms, made into a ball with syrup. The salts are given dissolved in warm water, with extract of ginger, one or two ounces. Follow these with

No. 3
1 Drachm nitro-muriatic acid,
3 Grains bichromate of potash,
2 Drachms chlorate of potash,
½ Pint water,
Mix.

Give as one dose, two or three times a day.

If the patient is weak, instead of giving the salts give stimulants—rye whiskey, ale, turpentine, or ether in from one to two ounce doses, three or four times a day. Sponge off the body with cold water and rub dry; cauterize all wounds, if the disease comes through inoculation, with clear carbolic acid, sulphuric or nitric acid, or with chloride of zinc, but the whole of the diseased tissue must be reached. After cauterizing them, and also the tumors that may follow, apply poultices to them to encourage suppuration. In case of diffuse swellings, bathe them with vinegar, cold water and weak lotions of carbolic acid, etc.,—say one part to sixty of water; and inject beneath the skin, in several places, weak dilutions of carbolic acid,—one part of acid to one hundred of water.

Prevention.—Drain the soil in the pastures; either confine the stock to smaller pastures or increase the stock to feed the pasture more closely; when cattle, especially young ones, are thriving very fast on a rich succulent pasture or aftermath, confine them in a barn-yard four to six hours a day. Shelter the stock at night during late summer and fall, when the days are hot and nights cool, or rather cold,—when the dews are heavy and the air gets quite chilly towards morning; it is at this time that internal congestions are apt to occur. In dry, hot weather, remove the stock to high ground, where miasmatic gases exist to a less extent. Secure clear, pure water to drink; avoid too sudden fattening; see that barns and sheds are well ventilated and not overcrowded. The diseased

animals should be separated from the healthy; carcasses should be buried deeply, six feet at least, without being skinned, and covered with quick lime, and the graves fenced for a couple of years; the buildings where deaths have occurred or sick animals been, should be thoroughly disinfected. Avoid touching them, so far as possible, and wash the hands both before and after doing so, in carbolic acid, one to a hundred of water. Prevent dogs, cats, etc., from coming in contact with them, and never allow meat that is affected, or suspected of being affected, to be eaten.

VI. Variolo Vaccinæ, or Cow-Pox.

This is a contagious disease, and has been proven to be identical with small-pox of the human family; either can be produced in either men or cattle by inoculation from the other species. A heifer inoculated with virus of small-pox, will have a disease identical with the cow-pox; and men inoculated with cow-pox will have a disease that may be considered either cow-pox or a very mild form of small-pox. To have either, secures immunity from a subsequent attack at least to a great extent, or for a longer or shorter period, sometimes only for a year or two, and sometimes for a lifetime. Cow or kine-pox is a specific blood poison that has a period of incubation of three to nine days, shows itself by a slight fever for a couple of days, then breaks out in pimples on the teats, udder, flanks, escutcheon, and around the vulva, nose, mouth and eyes. These pimples, red at first, enlarge from day to day, till they attain a diameter of about half an inch to an inch, and become yellow. A distinct vesicle forms, breaks, runs a yellowish lymph, which is the active virus of the disease, dries up, a scab forms over it, and the whole trouble disappears as gently as it came.

The only trouble to be had from the disease, is in milch cows, from the teats getting sore, These are sometimes absolutely covered with the vesicles, and even confluent, rendering milking a very painful operation.

It runs a definite course, and heals up and disappears of itself, in from ten to twenty days. No treatment is necessary, except to avoid taking cold, and give a little extra care in the way of nursing. If the teats are so sore as to be very painful in milking, the teat syphon may be used; if it is cold weather, warm the syphon; oil it with olive oil, and pass it up the teat very carefully, and draw off the milk. Anoint the sores on the teats and udder nicely, twice a day, with carbolic salve or other healing and softening ointment. If the udder swells very much, frequent bathing with hot water and supporting with a bandage, as recommended for mammitis, will be a benefit.

THE TEAT SYPHON.

CHAPTER III.

NON-CONTAGIOUS BLOOD DISEASES.

I. PLETHORA.——II. ANÆMIA.——III. RHEUMATISM.——IV. URÆMIA.——V. SEPTICÆMIA AND PYÆMIA.——VI. TUBERCULOSIS AND PHTHISIS PULMONALIS.——VII. CANCEROUS ULCERS AND OSTEO SARCOMA.——VIII. PURPURA HÆMORRHAGICA.——IX. ASTHENIC HÆMATURIA, OR RED WATER IN CATTLE.——X. MALIGNANT CATARRH.——XI. MALIGNANT SORE THROAT.

I. Plethora.

This, which may be described as an over fat condition of the blood, is conducive to many very serious results by interfering with the circulation, especially that through the vital organs, rendering them inert and unable to eliminate from the system the effete material which, at such a time, exists in increased quantities. These impurities, left in the system, lead to blood poisoning, and to excessive congestions and inflammations in case of disease, thus greatly enhancing the dangers attending disorders of all kinds.

Causes.—It is caused by rich, stimulating food, such as oil-cake, corn and other grain, roots, and too succulent green food and pastures,—in fact, anything that fattens very fast.

How to know it.—Unusually rapid improvement, exuberant spirits, sleek hair, loose skin, and tendency to fatten very fast. Occasionally, slight fever may be seen, at first of short duration, but increasing with each attack till violent congestion occurs, followed by inflammation; and death supervenes after a run of very high fever, or suddenly during the congestive stage.

What to do.—Deplete either by bleeding or purging. Take from two to six quarts of blood, or give a few doses of salts, in quantities of a single handful, morning and night for a week, at the same time removing to less luxuriant pasture, or curtailing the meal. The restricted diet and salts are preferable to bleeding.

II. Anæmia.

Causes.—This condition, the reverse of plethora, is seen when the animal is thin in flesh from lack of sufficient or proper kinds of food, especially when this is accompanied by exposure to the weather or impoverishment by parasites. It is apt to lead to purpura hemorrhagica, rheumatism, etc., and always predisposes to lice or other vermin.

What to do.—Destroy any existing vermin, and give the following recipe in the feed:

No. 4. ½ Ounce copperas,
1 Handful oil-cake,
Powder and mix.

Give as one dose. Repeat it morning and night, and let the diet be a nourishing, generous one.

III. Rheumatism.

Causes and forms.—The immediate cause of rheumatism is the accumulation in the system of a peculiar kind of acid, which has a tendency to settle around the joints, along the sheaths of tendons, and in the synovial membranes. In the acute form, which is that which it generally assumes, the affected parts swell, and often suppurate, discharging considerable quantities of pus, and with it more or less synovial fluid. It often extends to the bones and the membranes covering them, when it generally becomes chronic, and more or less exostosis is thrown out, which may anchylose (stiffen) the joint. Rheumatism frequently extends to the chest, and settles in the pleura, heart, etc., and sometimes causes diseases of the latter organ and death.

The exciting causes are poverty of the system, thinness in flesh, and exposure to cold and dampness,—to the two last-named either from want of shelter or from dampness in the stable caused by poor drainage.

How to know it.—There is lameness, stiffness, and disinclination to move, with a staring coat. After this has run on for a few hours, (or, it may be a day or two,) a joint—perhaps, two or three joints—will begin to swell, and is found to be quite hot, hard and painful; next morning the swelling will very likely be noticed in some other joint or in another leg, as the disease has a great tendency to fly from joint to joint and leg to leg. There is considerable fever, with high pulse, increased temperature, reddened mucous membranes, and a marked inclination to remain lying down all the time. The bowels are apt to be constipated, and the urine scanty and high colored. Abscesses form and discharge pus. The animal becomes emaciated, and frequently dies in a state of hectic.

What to do.—Put the animal in a dry, warm place to lie in, with plenty of bedding. Give generous diet and the following recipe:

No. 5. 2 Drachms colchicum.
2 Drachms nitrate of potash.
Mix.

Give as one dose, and repeat it morning and night in soft feed, for a week; then give No. 4 for a week, and change back to No. 5. Alter-

nate them in this manner for a month. As local treatment, apply the following to the joints:

No. 6.
1 Ounce laudanum,
1 Ounce spirits of camphor,
1 Ounce turpentine,
Water to make one pint,
Mix.

Apply three times a day, with friction, and bandage. If great weakness ensues, give the following:

No. 7.
1 Ounce gentian root,
½ Ounce ginger,
1 Quart oat meal gruel,
Mix.

Give as one dose, and repeat three times a day for two weeks.

IV. Uræmia.

In this disease, in consequence of the kidneys and bladder being out of order, the urine is absorbed back into the system, causing a peculiar poisoning of the blood, from an excessive accumulation of urea.

How to know it.—Dullness, loss of appetite and failure to secrete urine; the mouth and nose are dry, and the former is fœtid; rumination ceases, the coat stares, and a smell of urine is detected on the skin; pulse and respirations become slow, and the former is also soft; the pupils are dilated, and, too often, delirium, coma and death close the scene.

What to do.—Examine all parts carefully, in order to ascertain the cause, and then treat vigorously to remove it. Give large quantities of linseed tea to drink and, as a mild purgative, the following:

No. 8.
12 Ounces epsom salts,
1 Ounce ginger,
1 Ounce gentian,
1 Ounce syrup,
Water to make two quarts.
Mix.

Give as one dose. After it has operated, give a tablespoonful of saltpetre, three times a day, for two days.

V. Septicæmia and Pyæmia.

This is a condition resulting from the absorption into the system of putrid, poisonous matter, or pus, especially that from an ulcer or suppurating surface.

How to know it.—There will be a high fever, with increased temperature; pulse is fast and hard, and breathing quickened; the breath is fœtid; rumination is suspended; there is loss of appetite, staring coat, and emaciation, and in fatal cases, delirium.

What to do.—Discover the cause if possible, and if it is a sore of any kind containing pent up pus, (the most common cause), liberate it and dress the wound with the following lotion:

No. 9. ½ Ounce carbolic acid.
1 Pint water,
Mix.

Apply two or three times a day with a syringe, if there are passages; if the sore is on the surface, bind on a sponge wet with the lotion. If there is an ulcer, treat it as prescribed in the next article. Give the following mixture:

No. 10. 2 Drachms iodide of potash,
2 Ounces whiskey,
1 Ounce powdered cinchona,
1 Pint gruel,
Mix.

Give as one dose, repeating same three times a day, and feed liberally.

VI. Tuberculosis and Phthisis Pulmonalis.

This disease, which is analagous to phthisis in the human being, is characterized by small, gray, caseous (cheese-like) granules that soon run into calcareous masses.

Causes.—Any previous inflammation in the course of which the poison of suppuration has been absorbed into the system, the poison locating itself in the form of caseous tumors, varying in size from a small pea to a hen's egg. These tumors may be found in the lungs, pleura, peritoneum, sides of the diaphragm, and in various glands—mesenteric, liver, kidneys, etc. The flesh of such animals is sometimes unfit for food. This is always the case when the tumor, instead of becoming calcareous remains in a semi-fluid state, and is re-absorbed into the system, poisoning the whole body, and rendering the muscles pale and watery, and pitting upon pressure. When, however, these granules become hardened, and encased in a calcareous form, they are inert, and may be carried till the death of the animal, without harmful consequences to those partaking of its flesh.

Its hereditary character.—This cachexia or depraved condition of the system, with predisposition to tubercle, is oftentimes hereditary in all grades and classes of cattle, those called deep milkers and cold blooded, as well as the high, in-and-in bred ones. Still there can be no question that it is oftenest seen in the latter.

Prof. Williams, who regards it as both hereditary and congenital, says that he has seen a three months old calf die filled with caseous and calcareous, gray tubercular tumors. Prof. McEachran says it is hereditary and mostly found in strains of breeds that are related to each other by

too high a degree of consanguinity. The strain of the Dukes and Dutchesses, among the Durhams, seem to be peculiarly liable to it.

As mentioned in Chapter I, this Part, cattle seem peculiarly susceptible to this form of pulmonary disease. Hence, the breeder should guard this point carefully, and whenever he finds that his stock are deteriorating in constitutional vigor and hardiness, from too continuous in-and-in breeding, he should immediately change to an out cross.

How to know it.—The cachexia may either accompany or precede the tuberculosis, the earliest symptoms being a general unthrifty condition, the milk becoming poor in quality, thin and watery, although not much less in quantity. The appetite is capricious; the hair looks dull, and where it is white, there is a yellow skin; a dry, dull cough will be noticed; the animal no longer licks itself; if the cow is with calf, she is apt to abort; if not so, the condition of nymphomania is likely to exist. Emaciation ushers in the second stage, and progresses rapidly; the cough gets worse, but there is no expectoration; indigestion, tympanitis and diarrhœa follow, and soon reduce the sufferer to skin and bones. Auscultation, and percussion of the lungs may or may not detect a fullness and muffled breathing and other signs of disease, but nearly always some pain will be evinced when the sides are struck, or the fingers pushed forcibly in between the ribs.

Those affected always remain standing; the tubercles increase, sometimes breaking out on the surface of the body; the blood gets thin and watery, wanting in red corpuscles; and, often, fatal diarrhœa sets in.

What to do.—The treatment consists in counter-irritation to the chest by applying mustard paste or fly blister repeatedly, and giving oleaginous food, as oil-cake, cocoanut oil, etc., in liberal quantities, which will sometimes keep them along a good while. Avoid roots and grasses, since, in the weak condition of the digestive organs, these tend to produce tympanitis; but by suitable fattening food, supplemented by the use of cod-liver oil to the amount of half a pint a day, they may be fattened fast, if taken during the first stage. This secured, they might as well be slaughtered by the butcher; in later stages, nothing can be done to prevent gradual pining and death. The oil is best given with lime water; a little oil of turpentine may be added, if there is a tendency to tympanitis and diarrhœa. The flesh is unfit for food in the second stage, or when pining and emaciation begin.

The following recipe may be of service along with the generous diet.

No. 11. 2 Drachms saccharized carbonate of iron,
2 Drachms powdered cinchona bark,
Mix.

Give as one dose in soft feed, twice a day.

VII. Cancerous Ulcers and Osteo Sarcoma.

Tuberculosis sometimes shows externally, attacking the glands, especially the parotid and sub-maxillary, or the bones, in the latter case being

TUBERCULAR ULCER ON THE PAROTID GLAND.

OSTEO SARCOMA OF THE LOWER JAW.

known as cancer of the bone, or, more strictly, *Osteo Sarcoma*. This enlargement of the bones may come on the jaws, ribs or any part of the body. The tubercular deposits usually start in small, loose nodules, which

OSTEO SARCOMA OF THE UPPER JAW.

BAD EFFECTS OF EXCESSIVE USE OF CAUSTICS.

A large hole through the cheek into the mouth, from excessive use of caustics in the treatment of bone cancer.

increase in size till inflammation sets in, and nutrition being cut off from the skin, the latter sloughs off, leaving a large raw sore that defies all treatment and, instead of getting better, grows worse continually. Larger and more angry-looking becomes the sore; an ulcerous, sanous discharge flows from it; other ulcers are likely to form around it; and the enlargement beneath increases till, if the trouble is in the glands above-mentioned, it presses upon the pharynx and larynx, thus interfering with the breathing and swallowing.

Tubercles sometimes locate around joints, causing lameness, which is aggravated by strong liniments and blisters.

Treatment is of no avail, further than to afford a suitably generous diet.

VIII. Purpura Hæmorrhagica.

This is a specific blood disease quite common in the horse and pig, but rare in cattle. It originates in an impoverished condition of the system, more especially the blood, which becomes deficient in red corpuscles, fibrin, etc., and oozing through the coats of the vessels, falls by gravitation to the more dependent portions of the body, causing swelling of the legs and belly, and also of the head, beginning with the muzzle and gradually working up till it reaches the brain. For an extended description of this disease the reader is referred to the account given in the Horse department of this work.—Chapter XIII, of Part II.

SWELLING OF THE JAWS, CHEEKS AND MUZZLE, IN PURPURA HÆMORRHAGICA.

What to do.—The system needs to be toned up, the blood improved, and swellings fomented in hot water. Foment the head especially, as continuously as possible, and give the following recipes:

No. 12.
1 Ounce oil of turpentine.
½ Pint linseed oil.
Mix.

Give as one dose; repeat three times a day, for two or three days.

No. 13.
½ Ounce tincture muriate of iron,
1 Ounce tincture of cinchona,
2 Ounces water,
Mix.

Give as one dose; repeat three times a day, giving it in between the doses of No. 12. As to food, give whatever the animal will eat.

IX. Hæmaturia, or Red Water in Cattle.

As the name implies, this is a blood disease. Large quantities of albumen and some iron are secreted by the kidneys and excreted with the urine, which looks as though it were colored by blood, beginning, as it does, in a pale pink color, and running through the different shades till it becomes a dark brown. Really, there is no blood in it; the appearance in question is due to the presence, in excessive quantities, of albumen and iron and the coloring matter of the blood. As the secretion of the two former increases, the color darkens. There are also discharged numerous epithelial cells from the mucous membrane of the kidneys and bladder. The blood undergoes a change; the cells or corpuscles break, and let their contents escape into the *liquor sanguinis*, and hence the commingling of the coloring matter of the blood with the urine.

Causes.—These are obscure, but seem to depend in some way upon the food. Most commonly seen in cattle pastured in low, swampy lands, the disease disappears in such cases when the land is drained.

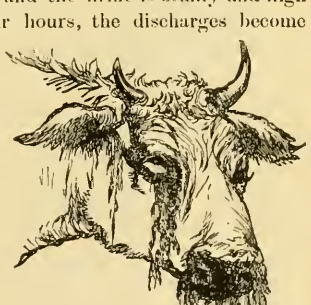
How to know it.—In addition to the color of the urine, a characteristic feature is the great increase in its quantity. It may run on for two or three weeks without apparant damage; then the milk will fall off both in quantity and quality; emaciation sets in; the bowels at the outset may be loose, but soon become obstinately constipated; the pulse gets quick and weak; the cow blows more and more, from increasing weakness; at the left side the heart may be heard to palpitate with quite a perceptible noise, owing to the watery condition of the blood; the debility and anæmia rapidly increase, and death soon follows.

What to do.—Give a purgative recipe, No. 8, and follow it with recipe No. 4. Continue the latter for three or four weeks. Make a complete change of food, and feed liberally on oil-cake, etc.

X. Malignant Catarrh.

In this malignant blood disease, the sinuses of the head are affected, causing offensive discharges from the nose. These, at first, are watery, but further along become purulent, and in the last stage are accompanied with extensive sloughing.

How to know it.—It is ushered in with a shivering fit, with all the attending symptoms of fever; the muzzle is hot and dry; the animal hangs his head and isolates himself in the pasture; the membranes are of a bluish color; the eyes are closed and swollen; soon the nose and eyes begin to run a watery fluid, and saliva drools from the mouth. The pulse is quick and not over strong; a dry, hard cough ensues; the bowels are usually costive, the fæces being black and hard, but diarrhœa is liable to set in at any time. There is great thirst, but no appetite, and the urine is scanty and high colored. In the course of twenty-four hours, the discharges become purulent, taking off the hair wherever they touch; the sinuses of the head become so much inflamed, and so filled up with pus, that when the head is tapped on the outside with the fingers, a dull heavy sound is heard. The breath becomes fœtid, and the temperature rises to 104° or 105°. Cows with calf are apt to abort.



MALIGNANT CATARRH—LAST STAGE.
Showing extensive sloughing, and discharge of the humor of the eye, from ulceration of the cornea.

The last stage is marked by extensive sloughing, so much so that sometimes the feet and horns come off. The prostration is very great; the pulse becomes imperceptible; convulsions follow, and a great fall in temperature, sometimes to 95°, or even to 90°; in some cases, ulceration of the cornea takes place, letting out

the humors of the eye. Death follows in the course of nine to eleven days. On post mortem examination, the blood is found to be black and not coagulated.

What to do.—Remove to a cool, isolated place, if in summer; to a warm place, if in winter. Give recipe No. 8, and follow it with Nos. 10, 11 and 4, alternating them. Foment the head with hot water liberally, and rub the following liniment well in once or twice a day:

No. 14. 1 Ounce linseed oil,
1 Ounce oil of turpentine,
1 Ounce liquor ammonia,
Mix.

Apply the following lotion to the eyes, if not eaten through:

No. 15. 10 Grains nitrate of silver,
1 Ounce water,
Mix.

Apply twice a day to the cornea with a camel's hair brush. If the cornea is punctured, touch it once a day with a stick of lunar caustic, in addition to using lotion No. 15. Touch the caustic directly to the hole in the cornea.

XI. Malignant Sore Throat.

This is a disease that centers itself in the throat, in the form of acute inflammation, followed by an effusion that is apt to cause suffocation by pressure on the larynx. Its scientific designation is *œdema glottidis*. It is fatal to cattle; also to swine, in which it is known as quinsy. The malignant sore throat of anthrax is a different thing, though many of the symptoms are similar.

MALIGNANT SORE THROAT.

How to know it.—It starts like a common cold,—some fever, injected mucous membranes, cough, etc.; the throat swells enormously; the tongue becomes spotted with purple, and is protruded; the animal gasps for breath, until at length he falls suffocated, struggles a little, and dies.

What to do.—It usually attains its height in three or four days. Apply recipe No. 14 to the throat, externally, and inject a little of the following well back into the throat, several times a day:

No. 16. 1 Ounce chlorate of potash,
1 Pint water,
Mix.

If speedy suffocation is threatened, tracheotomy must be performed. (See "Operations.")

The flesh of cattle affected with this disease is very poisonous, causing putrid fever in those eating it. The carcass should be buried deep, without removing the skin.

CHAPTER IV.

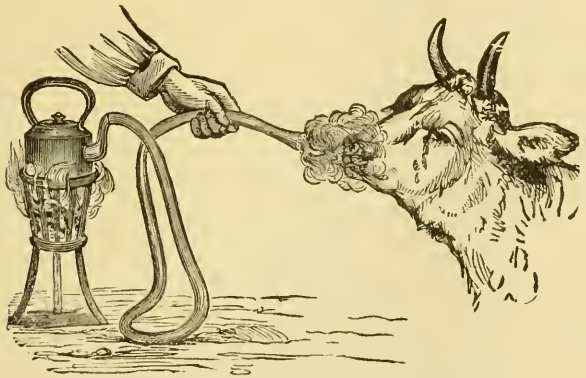
DISEASES OF THE RESPIRATORY ORGANS.

I. SIMPLE CATARRH OR COLD.——II. LARYNGITIS, OR COMMON SORE THROAT.——III. BRONCHITIS.——IV. PNEUMONIA.——V. PLEURISY.——VI. HYDROTHORAX.——VII. EMPHYSEMA OF THE LUNGS.

I. Simple Catarrh or Cold.

Simple cold or coryza, is inflammation, more or less acute, of the mucous membrane lining the nostrils and sinuses of the head, usually implicating the eyes and throat. If neglected, it is apt to run down to the lungs, and cause bronchitis and pneumonia.

Cause.—Damp, badly drained stables, and those built so as to allow drafts; exposure to storms and winds; sleeping on the ground in cold weather, etc.



APPLICATION OF STEAM TO THE NOSTRILS WITH THE JET.

How to know it.—There is more or less fever, with fits of shivering; hot mouth, dry nose, and horns hot at the head and cold at the tips; ears and extremities cold; sneezing, and sometimes a cough. At first, watery mucus discharges from the nose; the eyes are red and inclined to weep, with the eyelids swollen; and the bones of the forehead are hot and tender when tapped. After a day or two, the discharge from the nose becomes purulent, and the tears begin to scald the cheek; the

coat stares; the pulse is rapid and rather hard; the appetite fails, and rumination ceases; the urine is scanty and high colored, the bowels very likely being constipated. All these symptoms will be aggravated, should the fever run very high and the inflammation tend decidedly to run down the air passages.

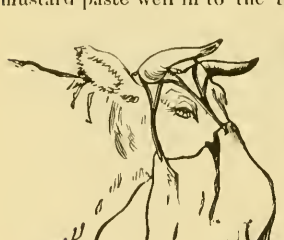
What to do.—Remove the cause, by putting the animal in a comfortable, dry place. Give a pint of melted lard, if the bowels are constipated; if too loose, give the following:

No. 17.
1 Pint infusion of quassia,
1 Ounce laudanum.
½ Ounce sulphuric ether.
1 Pint thin gruel, cold.
Mix.

Give with a bottle as one dose; repeat it after six or eight hours, if necessary. But begin on a fever mixture, as follows:

No. 18.
3 Ounces spirits of nitre,
2 Drachms tincture aconite root,
½ Ounce fluid extract of belladonna.
2 Ounces nitrate of potash,
2 Ounces muriate of ammonia,
Water to make one quart,
Mix.

Give half a teaspoonful every two or three hours till better. Rub mustard paste well in to the throat and over the forehead between the eyes. If the breathing is interfered with, steam the head in a nose-bag, or with a hose from the snout of a kettle, or over a tub with a blanket thrown over the head to confine the steam, the object being to soften the discharge and make it run off. This may be repeated several times a day if necessary, taking care, in using the steam jet, to avoid scalding or suffocation. Let the animal have all the water he desires, placing it before him, so that he may help himself. Feed on soft, sloppy food. When the fever is broken, the appetite being good, give the following recipe in the food:



NOSE-BAG FOR STEAMING.

No. 19.
2 Drachms nitrate of potash,
2 Drachms gentian root, powdered,
1 Drachm ginger.
Mix.

Give as one dose, repeating it morning and night for about a week.

If the appetite is too poor to take it thus, give the following from a bottle:

No. 20.
½ Pint infusion of gentian.
1 Drachm ginger,
1 Drachm carbonate of ammonia,
2 Ounces syrup.
½ Pint water,
Mix.

Give as one dose. Repeat it three times a day, till the appetite is good enough to take No. 19 in the feed. When the fever has left entirely, give the following in soft feed, a bran mash or oat meal, morning and night:

No. 21.
3 Drachms sulphate of iron (copperas),
2 Drachms gentian,
1 Drachm ginger,
1 Drachm fenugreek seed,
Powder and mix.

Give as one dose, twice a day for a week or two.

II. Laryngitis, or Common Sore Throat.

This is, as the name indicates, an inflammation of the larynx or upper part of the windpipe. It is dangerous on account of the interference to the breathing which is caused by the swelling, and also its tendency to run down to the lungs.

Cause.—It is usually brought on by the same influences as a common cold. Some animals appear predisposed to it, almost every slight exposure being sufficient to induce an attack.

How to know it.—There is inability to eat, and the cud is not chewed; the head is hung, the ears droop, and saliva drools from the mouth; upon examination, the throat is found to be much swollen, and if the finger be inserted under the tongue, the mouth is hot. The pulse is raised and breathing quickened; if the tumefaction is very great, especially on the inside, the breathing may also be labored. There is more or less fever, and when water is drunk some of it is likely to come back through the nose, owing to the difficulty of swallowing.

LARYNGITIS OR SORE THROAT.

What to do.—Rub mustard paste in well on the throat; after an hour wash this off and rub in more; if after two days the swelling does not come down, apply to it a linseed poultice, hot and soft, to encourage suppuration. Disolve a tablespoonful of saltpetre in the water drunk morning and night, and with a

syringe shoot a little of the following mixture well back into the throat, as a gargle, several times a day:

No. 22. 2 Ounces chlorate of potash,
1 Quart water,
Mix.

As additional treatment, a severe case might require tracheotomy. (See "Operations.") Any of the mixtures prescribed for catarrh in Section I. might also be used.

III. Bronchitis.

This is inflammation of the mucous membrane lining the bronchial tubes, which extend from the lower end of the windpipe to the lungs.

Causes.—It may develope as the immediate consequence of exposure, accompanying a common cold, or it may arise from the extension of the inflammation in laryngitis or catarrh.

How to know it.—There will be rapid, painful breathing, with a slight grunt at each expiration; a deep, hard, distressing cough; after it has run a few hours, considerable fever will be noticed; the pulse will be soft and full, ranging in different cases from fifty to eighty per minute; the temperature from 103° to 106°, as indicated by a thermometer inserted in the rectum; and while the surface of the body, nose, horns near the head, and mouth will be hot, the tips of the horns, ears and legs are very likely to be cold. The sufferer will not lie down. When the ear is placed to the sides and front of the chest, a dry, grating sound can be heard. After two or four days, the height of the disease will be reached, when the cough will get softer, the pulse softer and weaker, the temperature of the body more even, and when the ear is applied to the chest a mucous roll is heard, like air gurgling through water. Considerable mucus and phlegm are now raised with the cough, and when the sides are tapped a resonant sound is got, but not quite so distinct as in health. In a favorable case (which is what we are considering), at the end of five to eight days the fever subsides, the pulse gets fuller and stronger, the respirations are less rapid and painful, the cough diminishes, the mucus in the bronchial tubes is absorbed, and the appetite and normal discharge of the functions generally are restored, when he may be pronounced safely convalescent. If, however, it goes against him, the temperature increases, and all the symptoms are aggravated; before long, the inflammation extends to the lungs and pleura, and then we have a case of pneumonia or pleurisy and hydrothorax on hand.

What to do.—Put him in a warm place with good ventilation, and if the disease is in the first stage, that of congestion, give the following:

No. 23. 2 Ounces Mindererus' spirit (acetate of ammonia),
20 Drops tincture of aconite root,
½ Pint water,
Mix.

Give as one dose. Repeat it every two hours till the chill is over and the pulse reduced to soft, instead of being hard; then change to No. 18, which should be continued till convalescence is well established. Then change to No. 20, and after a few days to No. 21. Early and vigorous application of mustard paste to the sides is very important. Allow all the water to drink he will take, and feed on soft food.

IV. Pneumonia.

This is inflammation of the lung tissue—that is, of the lung itself. A severe cold (catarrh) may develop rapidly into this form, but it is oftener the sequel of laryngitis, bronchitis, etc., from their inflammatory conditions extending to the lungs. It is more common among cattle than any other domestic animals, and may affect one or both lungs.

How to know it.—The animal shows obvious preliminary symptoms, such as a severe shivering fit, staring coat, loss of appetite, cessation of rumination, and, if a milch cow, loss of milk. She is very averse to lying down, owing to the increased pressure it would cause upon the chest, thus augmenting the pain and difficulty in breathing. The pulse is full, soft and quick, ranging from 60 to 80 per minute; respirations from 30 to 40 per minute; and the temperature about 104° to 106°. When the sides are tapped, a dull, heavy, full sound is heard, and on placing the ear to the side there will be noticed an absence of the respiratory murmur in all affected parts; the expired air is hot; the ribs are fixed, the breathing being done by the abdominal muscles; the flanks heave, the nostrils are dilated, and the countenance has an anxious look. The lung becomes more or less hepatized (solid like liver), and this may terminate in resolution by absorption of the infiltration, and complete recovery follow, or it may go on to suppuration, with discharges of pus through the nose, which soon carries the patient off. Death may take place in any of the stages, viz: congestion, or first stage; hepatization, or second; or in suppuration, or third stage.

When the lung becomes solid, the cow braces herself and pants furiously, heaving the flanks as though each breath would be the last. If the head is raised quickly, she will fall backwards. When she has to fall finally, she drops first upon her knees and chest, and then down, and dies in a few minutes. On post mortem examination the diseased lung will be found to be solid from the exudations within the interlobular tissue.

When gangrene has taken place, which may occur before death, that part of the lung will be of a bluish black color, while the rest of the organ will be more of a dark brownish purple.

In case of abscess of the lung, there is a slow pining away, and death in an emaciated condition.

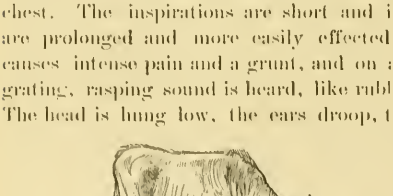
What to do.—The same treatment prescribed for bronchitis will answer in this case. Bleeding is not to be thought of, except in the very first stage, that of congestion, as, later, its weakening effects render it decidedly objectionable. If a fair chance is given the patient, recovery is probable in most cases, and although it sometimes leaves the wind hurt by the permanent solidification of a lung or part of a lung, this, in cattle, is a matter of small consequence.

V. Pleurisy.

Pleurisy is inflammation of the pleura, which is the serous membrane lining the cavity of the chest and investing the lungs. Of itself it is not fatal, but inflammations of all serous membranes are prone to abundant effusions, and the effusion following pleurisy is excessively great. It is called *hydrothorax* (water in the chest), and always indicates a very critical case.

Cause.—It is caused by exposure to cold storms, winds, etc., the same as other diseases of the breathing apparatus. Cattle seem to be particularly subject to it.

How to know it.—There is more or less fever; the pulse is quick, small and hard, and inclined to be wiry; the breathing is quick and painful; the elbows are turned out; the ribs are fixed, and the breathing done by the abdominal muscles; there is a crease, running from the elbows along the ribs towards the flanks, where the ribs join the cartilages of the chest. The inspirations are short and imperfect, but the expirations are prolonged and more easily effected. Pressure between the ribs causes intense pain and a grunt, and on applying the ear to the sides a grating, rasping sound is heard, like rubbing dry sheep skin together. The head is hung low, the ears droop, the nose is dry, and though the eyes are partly closed, the countenance wears an anxious look. Rumination stops, the appetite is lost, the flanks are tucked up, there is a hacking, painful cough, and the animal remains standing, with evident disinclination to move. There are sharp, shooting pains through the chest, that make the animal turn his head around to his sides. Unlike pneumonia, percussion on the ribs produces a clear,



ACUTE PLEURISY.

resonant sound, the expired breath is not hot, the nostrils are not dilated, and there is no mucous roll. Pleurisy may terminate in resolution by absorption, etc., the patient getting well very quickly, without any ill effects, or it may go on to the stage of great effusion, and terminate in hydrothorax.

What to do.—If taken right at the start, give recipe No. 23, but if the fever is far advanced give No. 18. When the fever is subdued, give No. 20, if the appetite is poor; if it is good, give No. 19. During convalescence give No. 21. Apply mustard paste to the sides assiduously.

VI. Hydrothorax.

As explained in the last section, when the chest fills with water from the excessive effusion of pleurisy, it is called Hydrothorax.

How to know it.—As soon as the effusion begins, all pain ceases, respiration is deeper, longer, and less painful, the belly drops, the elbows no longer turn in, the appetite returns, the eyes get bright, and to a casual observer, the animal appears to have taken a decided turn for the better; but in a very short time the practiced eye discovers unfavorable symptoms, such as flapping of the nostrils, a quick, labored breathing, and heaving of the flanks. The legs and chest become dropsical, the eyes sparkle, and the countenance resumes its anxious look. No respiratory murmur or other sound is heard by the ear, when placed to the side —none at least at the bottom—though, later, a splashing may be heard when the water reaches the heart; percussion on the ribs elicits a full, dull sound; the pulse becomes rapid but small, and gradually fades away until imperceptible. Death occurs from suffocation. Post-mortem examination reveals the chest filled with water, and shreds of lymph clinging to both the lungs and ribs.

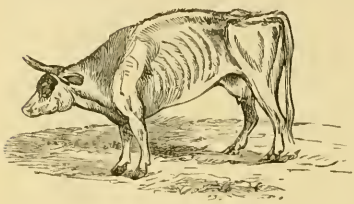
What to do.—If the sides are not thoroughly blistered from the mustard previously applied, apply fly blisters energetically, to get up a great amount of vesication (skin blistering), and give the following recipe:

No. 24.
2 Drachms gum camphor.
1 Drachms saltpetre,
1 Ounce spirits nitre,
1 Pint water or gruel,
Mix as directed below.

The camphor must be dissolved in the nitre, and then the saltpetre and water (or gruel) added. Give as one dose, and repeat it every four or six hours. Give ale, porter, etc., in liberal quantities. It is advisable to tap the chest early, repeating it if necessary. (See chapter on operations.)

VII. Emphysema of the Lungs.

This is a condition of the lungs very apt to mislead the inexperienced, there being few signs other than negative ones. The milk is noticed to be diminishing, and the cow falling off in flesh; the coat is staring and dirty, and hide-bound exists: the bowels are irregular, and the appetite poor; still, the mouth and nose are cool and moist, and the breath is sweet. The head is carried low; the back is arched, and tender on pressure; and there is weakness in walking. The temperature falls below the normal standard, and so does the pulse. Later, the ears and extremities become deathly cold, rumination ceases, and an uncontrollable, offensive diarrhœa sets in; the back arches more and more; the belly is tucked up; milk entirely stopped, the udder and teats being soft and flabby; the legs are spread to avoid falling; the pulse gets smaller and weaker, though not much faster: the appetite all gone, weakness becomes excessive; and death follows, after progressive symptoms running over a period of two months or more.



EMPHYSEMA OF THE LUNGS.

The post-mortem reveals ruptured air-cells, and extensive emphysema of the lungs. Very few blood vessels are found, owing to so many having been absorbed when the circulation became so weak as to allow the smaller vessels to collapse and become obliterated. The right ventricle of the heart is weak and thin, and contains a portion of a clot.

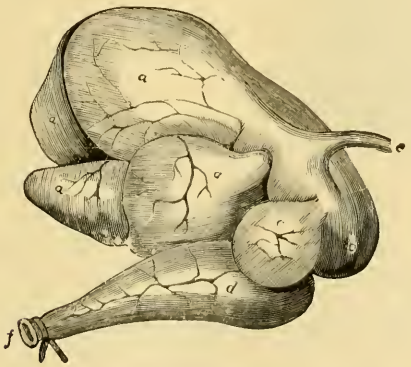
What to do.—While the disease is not curable, it can be alleviated by generous, oleaginous diet. This will fatten the cow, and fit her for the butcher, before it is too late.

CHAPTER V.

DISEASES OF THE DIGESTIVE ORGANS.

I. GLOSSITIS, OR INFLAMMATION OF THE TONGUE; AND PARALYSIS OF THE TONGUE. ——II. HOVEN, OR TYMPANITIS.——III. IMPACTION OF THE RUMEN, OR MAW-BOUND.——IV. IMPACTION OF THE OMASUM, OR FARDLE-BOUND.——V. DYSPEPSIA.——VI. CONSTIPATION.——VII. DIARRHŒA, OR SCOURS.——VIII. DYSENTERY.——IX. ENTERITIS.——X. PERITONITIS.——XI. HERNIA.——XII. STRANGULATION, OR GUT-TIE.

It will be readily seen by the annexed cut, that the stomachs of ruminants are very complicated, and hence when out of order, serious results often follow. By noticing the relative positions of the compartments,



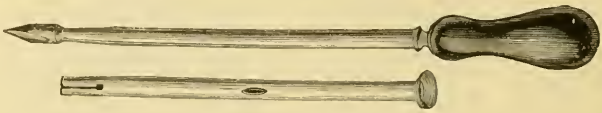
COMPARTMENTS OF THE STOMACH OF RUMINANTS.

a. Rumen, or first compartment.
b. Reticulum, or second do.
c. Omasum, or third do.
d. Abomasum, or fourth compartment.
e. Œsophagus, or gullet.
f. Entrance to the intestines, or pylorus.

the following pages will be more readily understood. The four compartments (or, as they are often termed, the four stomachs) all float loosely in the cavity of the trunk, excepting the paunch (rumen), which grows to the side in the left flank.

I. Glossitis, or Inflammation of the Tongue; and Paralysis of the Tongue.

The mouth and tongue are frequently wounded from drenching in a careless manner, or by foreign bodies in the fodder, thorns, etc. The



TROCHAR AND CANNULA.

swelling is sometimes very great, especially if it is the tongue that is injured. Temporary paralysis of that organ occasionally ensues, in which case it hangs from the mouth, like some lifeless appendage.

PARALYSIS OF THE TONGUE FROM AN INJURY.

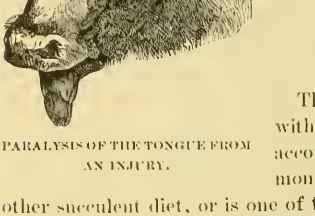
What to do.—Examine the mouth carefully, and remove all offending substances. If the tongue hangs pendulous, foment it with hot water; if very bad, a few scarifications, to make it bleed a little, will do it good. Apply the following lotion three or four times a day, with a swab:

No. 25. 1 Ounce vinegar,
2 Ounces honey,
½ Pint water.
Mix.

II. Hoven, or Tympanitis.

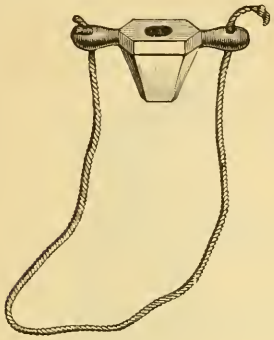
This is distension of the rumen or paunch with gas, the product of fermentation accompanying acute indigestion. It commonly follows a hearty feed on clover or other succulent diet, or is one of the *sequelæ* in a case of choking.

How to know it.—The paunch is terribly distended with gas, so much so that the space between the last ribs and the points of the hips is puffed up above the surface, and when tapped, is elastic and resonant, like a drum, especially on the left side. The breathing is difficult and painful, becoming more so as the gas increases; the nostrils are dilated, the eyes look wild, and gas and food are belched up from the stomach, and dribble from the mouth. The animal moves slowly and uneasily about, moaning with each expired breath. If not relieved, death follows from suffocation, rupture of the stomach, or blood poisoning by the gases.



OX SUFFERING FROM HOVEN.

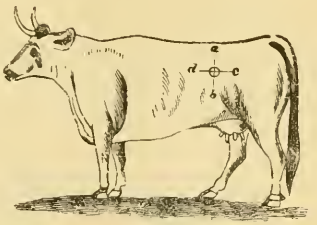
What to do.—If it is a very urgent case, plunge the trochar and cannula into the region of greatest distension on the left side, at a point



WOODEN GAG.

BALLING IRON.

midway between the spines of the loins, last rib and point of the hip, pointing the trochar in and downward, and letting it pass in obliquely to avoid the kidney. When food gets over the end of the tube (cannula), pass in a piece of whalebone and push it off. If the measures above directed are not practicable, and a probang is handy, insert the gag or the balling iron in the mouth, and with one man to steady the head, pass in the probang, which will evacuate the gas from the stomach. After the acute symptoms are over, give a brisk purgative. No. 8 will be found effectual. Feed light for several days.



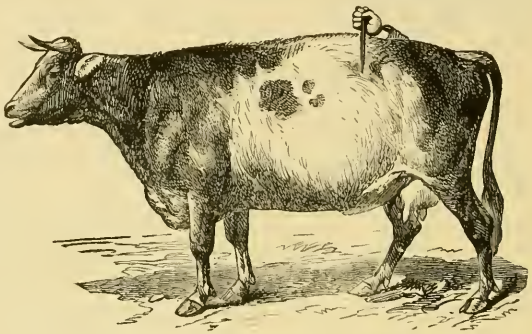
DIAGRAM, SHOWING WHERE TO TAP THE RUMEN FOR BOVEN.

Insert trochar at point where the lines cross.

III. Impaction of the Rumen, or Maw-Bound.

After an unusually full meal, the grain often becomes impacted in the animal's stomach, causing its temporary paralysis, the whole mass lying there like so much soggy stuff in a leather bag. Great distress necessarily follows, which is aggravated when fermentation sets in, death often resulting from suffocation, or in a more protracted case from nervous prostration and blood poisoning.

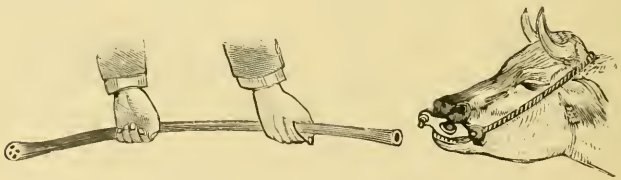
How to know it.—It will have the same outward appearance of tremendous distension as tympanitis, but when the bloated section is touched it is found to be soft and pitty, so that when dented the dent remains or rises slowly.



TAPPING THE RUMEN.

To evacuate the gas, in a case of hoven.

What to do.—When paralysis of the stomach has actually taken place from engorgement, there is nothing of any avail but to empty the rumen with the hand. This operation, which is termed rumenotomy, will be found described in the chapter on operations. When the stomach is



SECURING WITH THE WOODEN GAG.

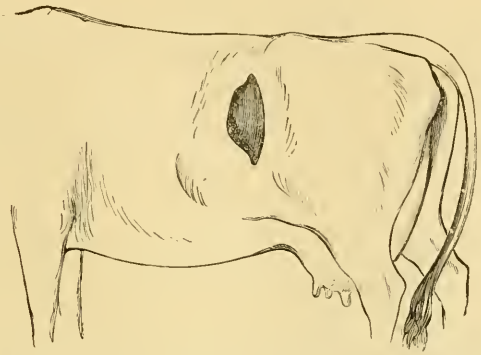
Prior to passing the probang to evacuate the gas from the stomach.

emptied, and before sewing up the wound, pour in carefully the purgative No. 8, with half a pint of ale added as a stimulant. Restrict the diet for a few days, giving only easily digested food—grass, sloppy mashes, etc.

IV. Impaction of the Omasum, or Fardle-bound.

The omasum, or third stomach, is a sack of a great many leaves, arranged so as to rub constantly on one another, keeping up a grinding action

on the food. This stomach is apt to suffer from want of moisture, whereupon the food becomes impacted between the leaves, leading to inflammation. This condition is variously know as fardle-bound, bake of the many-plies, bake of the manifolds, etc.



RUMEN EXPOSED FOR MECHANICAL REMOVAL OF ITS CONTENTS.

How to know it.—It comes on gradually as an ordinary case of constipation, with abdominal pain, a looking around to the right side, and disinclination to move; fever sets in, and slowly increases as the disease makes progress; there is great tenderness in the right side just below the ribs, at which point a hard round substance can be felt; the colic pains and fever grow more intense; the animal makes constant attempts to pass fæces; delirium and vertigo set in, and death soon follows.

What to do.—The treatment must be prompt and persistent. Give a full cathartic as follows:

No. 26.

1½ Pounds epsom salts,
2 Ounces ginger,
2 Ounces gentian,
2 Drachms calomel,
20 Drops croton oil,
1 Pint syrup,
2 Quarts warm water,
Mix.

Give as one dose, and encourage the drinking of as much water afterwards, from time to time, as possible. Give injections of warm water and soap every half hour. If it is cold weather, blanket the patient

warmly. To insure the action of the purgative, give every two hours a stimulating dose composed as follows:

No. 27. 1 Ounce liquor ammonia.
1 Quart warm ale.
½ Ounce essence of ginger,
Mix.

It is not safe to repeat the cathartic, nor would it be of any use; for if it remains inoperative, in spite of the stimulants, double the dose would not be any more likely to effect a passage.

When a passage is despaired of, and as a last resort, tepid water may be injected into the jugular vein, or galvanism applied to the region of the stomach; but the case is well-nigh hopeless.

V. Dyspepsia.

The lower animals are not supposed by the great majority of people ever to be troubled with dyspepsia, but they are, nevertheless. All the domestic animals are liable to suffer from chronic indigestion from irregular or improper feeding, especially if to this is added exposure to the cold storms and winds of the straw yard, without housing, etc.

How to know it.—A capricious appetite is noticed. Dainty at first, the animal may shortly be seen licking walls, dirt, or lime, and chewing sticks, etc.; he is inclined to eat the bedding, or take up coal, stones, etc., to chew, showing a depraved appetite for something he has not got. After a while, there will be a staring coat, eruptions, belchings from the stomach, and emission of gas from the rectum; the manure is small in quantity, dry and glazed; the flanks drop in, except when distended with gas; the skin and hair feel dry and coarse: and there is a rapid loss of flesh. It is not often a very serious condition in itself, but it weakens the animal and lowers the tone of the vital functions, so that he is unable to resist other diseases; and it especially predisposes to attacks of tympanitis, constipation or diarrhœa, tuberculosis, cancerous ulcers, and purpura hæmorrhagica.

What to do.—Give phosphate of lime in the form of ground bones, and a little lime water—about half a teacupful—morning and night in a bran mash, or the following recipe:

No. 28. 3 Drachms bi-carbonate of soda.
2 Drachms gentian,
2 Drachms ginger,
Mix.

Give as one dose, repeating it morning and night. Give a complete change of food, including some green grass, roots, etc.

VI. Constipation.

This is the condition which exists when there is not sufficient moisture in the stomach and bowels, and the fæces are passed tardily and in hard, dry lumps. It is always aggravated, and often caused, by too dry food, insufficient or impure water and too little exercise. It is often symptomatic of other diseases, especially of liver complaints.

How to know it.—It is recognized by the hard, dry manure, which is also sometimes glazed. It is apt to run into inflammation of the bowels, colic, etc., and when existing as a symptom of other diseases, nearly always indicates serious derangement of the system.

What to do.—If it is in the winter or late in the fall, give from one to two quarts of melted lard; if in the spring or summer, give recipe No. 8. Give laxative food with more bulk, and plenty of good, pure water to drink. Salt the cattle at least twice a week in winter, and three times in summer. If a mild case, it is quite possible that laxative food, with a handful of salt and plenty of water, will be all that is needed. Injections of warm water and soap are valuable adjuncts to either laxatives or purgatives.

VII. Diarrhœa, or Scours.

This is caused by improper and inferior food, irregularity in feeding, etc., and like its opposite, constipation, often accompanies other diseases, particularly indigestion and dyspepsia, especially if dependent upon an acid condition of the system.

How to know it.—The manure is passed much too often, and in a thin, watery condition, at times with considerable straining. If it runs on long, there is a feverish condition of the stomach and bowels, with great thirst, but little or no appetite: rumination is suspended; the milk dries up; the belly is tucked up and the back arched; the coat stares; in some cases there is considerable flatulence. The further progress of the disease is marked by rapid loss of flesh and animal heat, the temperature falling more and more below the normal; the pulse rises as the weakness increases, and at length becomes imperceptible; and death follows, as a result of the cessation of the digestive functions, and consequent lack of nutrition. It is further hastened by the weakening effects of the excessive discharges. It is particularly fatal to young calves, among whom it is quite common.

CALF SUFFERING FROM DIARRHŒA.

What to do.—Usually, the best plan is to give alkalines along with astringents, with anodyne enemas. It is often the case, however, that laxatives, or even purgatives, are

needed, to restore a healthy condition to the stomach and bowels. For young calves that are fed on milk,—with whom an acid condition of the stomach is common,—give one or two tablespoonfuls of limewater, in the milk, night and morning; and a teacupful of gentian infusion, with a quart of starch gruel, may be added to the milk and limewater. Any of the following mixtures may be given:

No. 29.
1 Ounce prepared chalk,
½ Ounce powdered catechu,
2 Drachms powdered ginger,
½ Drachm powdered opium,
½ Pint peppermint water,
Mix.

Give, morning and night, from two to four tablespoonfuls, according to the size of the calf.

No. 30.
2 Ounces tincture of catechu,
2 Ounces tincture of cardamoms,
2 Drachms carbonate of soda,
Mix.

Divide into two to four doses, according to age of calf, and give one of them morning and night.

No. 31.
½ Drachm powdered opium,
1 Ounce tincture of cardamoms,
3 Drachms sulphuric ether,
1 Pint linseed tea, (or starch gruel),
Mix.

Divide into six doses, and give one of them night and morning. If astringent mixtures and the limewater do no good, give from two to four tablespoonfuls of castor oil, or, instead, the following mixture:

No. 32.
1 Ounces tincture of rhubarb,
2 Drachms powdered ginger,
1 Ounces warm gruel,
Mix.

Give as one dose, and follow it with some doses of No. 30 or 31. The four recipes above given, it must be remembered, are all for calves.

For full grown cattle, give some of the following mixtures:

No. 33.
1½ Ounces prepared chalk,
2 Drachms powdered catechu,
½ Drachm powdered opium,
2 Drachms powdered gentian,
1 Pint starch gruel,
Mix.

Give as one dose, and repeat in twenty-four hours if necessary.

No. 34.
2 Drachms powdered opium,
1 Ounces powdered starch,
1 Ounce sulphuric ether,
1 Pint cold ale,
Mix.

Give as one dose. By substituting tepid water for the ale, this recipe may also be used with advantage as an injection.

No. 35.
½ Drachm tannic acid,
1 Drachm powdered opium,
1 Ounce powdered gentian,
1 Pint warm ale,
Mix.

Give as one dose.

If laxatives are required, give half a pint of melted lard, or, instead, the following mixture:

No. 36.
1 Drachm calomel,
2 Drachms powdered opium,
1 Quart gruel,
Mix.

Give as one dose.

In all cases, restrict the quantity of drinking water, allowing it often but only a little at a time, and dissolving an ounce of chlorate of potash in each pailful of water. Feed on light, easily digested food, and keep the animal perfectly quiet for a few days.

VIII. Dysentery.

How to know it.—The inflammation of the mucous lining of the stomach and bowels which characterizes this disease, causes severe straining, and watery, offensive, bloody discharges, and high fever, with excessive thirst; there is loss of appetite; the secretion of milk ceases, as does rumination also; emaciation begins early and rapidly increases; discharges from the eyes are seen; colicky pains occur frequently, the back being arched, and tail elevated; the general prostration is very great, and often proves fatal. If too much water is drank, tympanitis is liable to ensue and cause death suddenly from suffocation.

Causes.—Dysentery may follow the ingestion of acid, poisonous plants, or it may come on as the sequel of neglected diarrhœa, or of almost any other debilitating disease.

What to do.—Give a laxative as follows:

No. 37.
7 Ounces epsom salts,
2 Drachms powdered opium,
2 Drachms powdered gentian,
1 Pint gruel,
Mix.

Give as one dose. Or, instead, No. 36 may be given. Dissolve chlorate of potash in the drinking water, as prescribed for diarrhœa. Give frequent injections of starch gruel, with an ounce of tincture of opium in each one. If the feces are very offensive, give the following, half of it by the mouth, and the rest as an injection:

No. 38.
½ Ounce chloride of lime,
½ Ounce tincture arnica,
1 Ounce sulphuric ether,
2 Quarts starch gruel,
Mix.

Any of the astringent recipes given for diarrhœa are applicable, following the administration of laxatives. Feed lightly, and nurse carefully.

IX. Enteritis.

This is inflammation of the digestive apparatus, and especially (as its name implies) of the intestines, but is quite different from the inflammatory state of dysentery.

Causes.—It may come from eating various poisonous substances, either vegetable or mineral; or it may follow the too sudden checking of diarrhœa. Injuries to the abdomen sometimes cause it.

How to know it.—There is constipation, such feces as are passed being hard, dry, and coated with mucus, and sometimes offensive and bloody; high fever and quick, hard pulse; dry mouth, with an offensive fur over the tongue and cheeks; the thirst is insatiable; the appetite fails, and so does the milk; rumination is suspended; colicky pains may occur, though the pain is more likely to be constant; breathing becomes labored, and more or less tympanitis may be noticed; the urine is scanty and high colored; the back is arched; the animal moans, grinds his teeth, and refuses to move; the pulse gradually becomes imperceptible, and the extremities cold; and death soon follows, after an illness lasting from one to two weeks.

Post mortem appearances are usually as follows: The first and third stomachs are filled with food, dry and impacted—almost baked, and when this is taken out, the epithelium of the stomachs comes off with it; the fourth stomach and bowels are inflamed; and more or less lymph, in shreds, is found, as also some ulcers, in the large intestines. The liver is generally softened, and all other internal parts very much bleached, indicating great wasting.

What to do. Give a purgative as promptly as possible. No. 26, omitting the croton oil, will be the thing. Encourage the animal to drink large quantities of water and other fluids, and supplement the purgative with the following injection:

No. 39.
1 Pint linseed oil,
4 Ounces oil turpentine,
30 Drops croton oil,
1 Quart warm water,
1 Ounce soft soap,
Mix.

Repeat three times a day till a full purgative action is got. If the constipation does not yield, give hypodermic injections as follows:

No. 40.
1 Grains strychnine,
1 Ounce spirits of wine,
6 Drops sulphuric acid,
Mix.

When dissolved, inject from ten to twenty drops under the skin with a syringe suitable for the purpose. Ten drops of this solution contain one-twelfth of a grain of strychnine. If prostration follows, give the following:

No. 41.
2 Drachms camphor,
½ Ounce sulphuric ether,
4 Ounces acetate of ammonia (as directed below),
Mix.

The camphor is to be dissolved in the sulphuric ether, and the other ingredient added afterwards. Give as one dose in ale or gruel.

If violent purgation takes place, it can be controlled with flour and water,—a double handful of flour to four or five quarts of water; or linseed tea may be given to drink. The prescriptions for diarrhœa will be found convenient in cases of superpurgation.

X. Peritonitis.

This is inflammation of the peritoneum, a serous membrane lining the cavity of the belly, and covering the bowels and other abdominal viscera.

Cause.—It is always the result of injury, or of secondary inflammation following the operation of rumenotomy.

How to know it.—The animal stands dejectedly, and has fits of shivering, which are especially noticeable around the flanks and hind parts; all the symptoms of fever are present, the pulse, urine, temperature, rumination, etc., all being affected; the breathing is labored and done mostly with the chest, the ribs being fixed; the sufferer looks around to her flanks, and paws or crouches with pain; all the symptoms become aggravated, and the temperature suddenly falls below the normal; the belly fills with water, and death speedily follows.

If a post mortem is had, large quantities of reddish water will flow from the belly, as soon as the membranes are cut, and unmistakable signs of inflammation will be seen around the injury; and sometimes there are adhesions between the intestines.

What to do.—Give recipe No. 8, following it six or eight hours after with No. 36; also, frequent injections of soap and water. No. 18 may also be given with advantage. If prostration follows the action of the purgative, give No. 41. During convalescence, give No. 21.

XI. Hernia.

This is familiarly known as rupture. The investing membrane of the abdomen is torn, as a result of external injury or of severe strain, thus letting out the intestines into the adjacent spaces. The swelling or enlargement of the hernia is sometimes seen as large as a half bushel. It is soft, and is easily pushed back if not very large. Sometimes, when a great quantity of the intestines is protruded, what is called strangulated hernia results, which is always dangerous, and unless reduced, causes death from inflammation and mortification. Umbilical hernia (at the navel) is sometimes seen at birth in calves.

What to do.—For calves, a compress or truss is put on, as shown in the annexed cut, adjusting it so as to make considerable pressure. If this fails, wooden clamps, applied so as to include the skin over the rupture, and just tight enough to set up a certain amount of adhesive inflammation, will be effectual, the compress being applied over the clamps.

In ventral (belly) hernia, little can be done, unless the rupture is small, in which case the same appliances may be used. In a case of strangulated hernia, when the gut cannot be pushed back, the skin may be opened and the parts put back and the wound sewed up again,—first that in the abdominal wall, and then the skin,—and a compress applied.

TRUSS FOR UMBILICAL HERNIA.

Scrotal hernia is very difficult to reduce. The animal must be castrated by what is called the covered operation, for which a qualified veterinary surgeon will be required.

XII. Strangulation, or Gut-tie.

This is a passage of the intestines into the abdominal ring. It is only seen in steers and oxen. The contraction of the spermatic cord following castration leaves the abdominal rings open, and during severe exertion, as in hard work, the intestines are forced through.

How to know it.—All the symptoms of abdominal difficulty are seen, together with pain and soreness in the flank affected.

What to do.—The ox must be cast, an opening made in the flank, the gut replaced, and the opening sewed up again, and a compress applied, most of which are difficult and delicate operations, that require the services of a qualified veterinary surgeon.

CHAPTER VI.

DISEASES OF THE URINARY ORGANS.

I. NEPHRITIS, OR INFLAMMATION OF THE KIDNEYS.——II. RETENTION OF THE URINE, OR DYSURIA.——III. INCONTINENCE OF URINE, OR ENURESIS——IV. ALBUMINURIA, OR ALBUMINOUS URINE.——V. HÆMATURIA, OR BLOODY URINE.——VI. CYSTITIS, OR INFLAMMATION OF THE BLADDER.——VII. LITHIASIS, OR GRAVEL. ——VIII. CALCULI.

I. Nephritis, or Inflammation of the Kidneys.

Causes.—External violence, wounds, strains, etc.; eating acrid, diuretic plants; and too free use of diuretic medicines.

How to know it.—It is rather rare in cattle. When it occurs, there are colicky pains, with great uneasiness; the urine is thick and dark colored, and voided often, in small quantities and with much straining and pain; there is tenderness over the loins, especially at the sides, immediately below the transverse spines of the lumbar vertebræ; the gait is straddling, and lameness is noticeable,—sometimes in one leg, sometimes in both: the appetite is poor; fever runs high; rumination ceases; sometimes blood, and in the later stages pus, is evacuated with the urine: the nose becomes hot and dry, the horns and extremities cold, and the breathing labored. Diarrhœa often sets in, and sometimes dysentery; and this state is usually followed by constipation. There is profuse sweating, great pain, and arching of the back; the pulse becomes small and weak; and stupor and death soon follow.

OX SUFFERING FROM INFLAMMATION OF THE KIDNEYS.

Post mortem shows the affected kidney or kidneys enlarged and congested—usually, with an abscess also.

What to do.—Avoid purgatives, especially salines, but give the following recipe in preference:

No. 42.
3 Ounces Mindererus' spirit,
20 Drops tincture aconite root,
1 Pint linseed tea,
Mix.

Give as one dose. Repeat it every two hours till better, then drop off in frequency as the case will admit. Give large quantities of linseed tea or slippery elm water to drink, with warm water injections. Apply

hot water rugs to the loins. Feed on sloppy food, and keep the patient perfectly quiet.

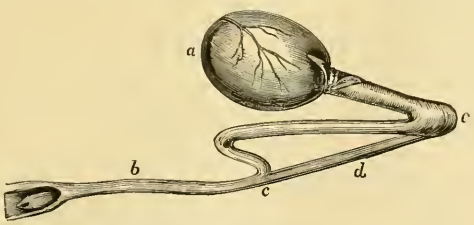
If the animal recovers, he had better be fed for the butcher, for the trouble is liable to recur, and unremitting care would be required to guard against the effect of storms, extremes of temperature, etc.

II. Retention of the Urine, or Dysuria.

Cause.—It may be brought on by eating acrid herbs, causing inflammation of the urinary organs, irritability and spasms of the neck of the bladder. Most commonly, however, it is a symptom of some other disease, the pressure upon the neck of the bladder resulting from inversion of the rectum, calculi, or other visceral trouble.

How to know it.—Frequent but ineffectual attempts to pass the urine, straining, and colicky pains; the hind legs are raised and moved about restlessly, and the animal looks around towards the flank.

What to do.—Give hot water injections by the rectum, (and in the female by the vagina also); add to the injection one ounce of opium, or three drachms of fluid extract of belladonna. Repeat these in fifteen minutes. If there is still no relief, the urine must be drawn off with a catheter. With the female this is very easily done, the catheter being inserted through the opening to the bladder, which will be found on the floor of the vagina, and about three inches from the external orifice. With the male it is a far more serious operation, and, unfortunately, retention of the urine is far more common in the male than in the female, owing to the peculiar formation of the urethra, a slight pressure on one



URETHRAL CANAL, ETC., OF THE OX.

a. The bladder.
b. The urethral canal.
c. Curves of the urethral canal.
d. The retractor muscle of the penis.

of the curves being sufficient to cause the difficulty. The operation necessary to draw off the urine from the ox will be found described in the chapter on operations. After using the catheter, give the injections prescribed above, with a light diet and some linseed tea, for a few days.

III. Incontinence of Urine, or Enuresis.

This difficulty may be considered the opposite of that just considered; the urine dribbles away involuntarily.

Cause.—Paralysis of the muscular coat of the bladder and sphincter vesicæ; calculi; or pervious urachus after birth.

What to do.—Give purgative No. 8, and follow it with one and a half drachm doses of nux vomica, morning and night, in soft feed. If there are calculi, remove them. If the case is a bad one, inject cold water into the rectum, and give ten grains of powdered cantharides in soft food, morning and night.

IV. Albuminuria, or Albuminous Urine.

This is the same as Bright's disease in the human subject, and, in strictness, is probably a blood disease.

Cause.—The blood is impoverished, to a certain extent, by too much and too long continued sameness of diet, in consequence of which there is a deficiency of blood forming constituents, with a low, unassimilable quality of albumen, which is excreted by the kidneys. This leads in time to a degeneration of those important organs in two different forms,—the large, white kidney, and the small, red kidney. The former secretes very little urine, the latter great quantities of it.

Albuminuria is most common in sections where turnips are the almost exclusive diet. They cannot, alone, support the system in a healthy condition, and the impairment of the vital functions thus resulting, seems to affect the kidneys more than other organs, and in this peculiar way. It is generally regarded as the effect of bad management and injudicious feeding.

How to know it.—In those rare cases where the trouble arises from an injury, the back will be arched and the feet drawn together, indicating injury to the loins; but in ordinary cases, the most common and characteristic symptom is the stretching at full length, getting the hind and fore feet as far apart as possible. Generally, there is constipation, a straddling gait, stiffness, and disinclination to move. The urine, which is thick, mucilaginous and dark colored, often fails to produce albumen on the application of heat (a common test), but with tincture of galls, solution of bi-chloride of mercury and alcohol, will always separate some. Death often results from paralysis of the hind parts, blood poisoning and coma.

What to do.—Examine the bladder; if full, evacuate it as described for retention. Give recipe No. 8, and injections, to overcome the constipation, and afford a complete change of diet, cutting short on green food, except grass, which should be from uplands, but allowing more

grain. Also, give milk, eggs, etc. If it still continues, give the following recipe:

No. 43. 2 Drachms sulphuric acid,
1 Ounce tincture of cardamoms,
1 Pint water,
Mix.

Give as one dose.

V. Hæmaturia, or Bloody Urine.

Of this there are two kinds. *Traumatic hæmaturia* is the effect of external violence, by which the loins and kidneys are injured, and may be recognized without difficulty, by the blood passing in clots distinct from the urine which contains them.

Idiopathic hæmaturia follows active congestion of the kidneys from calculi, eating acrid herbage, excessive use of diuretics, and the like causes. It may be distinguished by the red appearance of the urine. There are also signs of fever, and, upon suitable tests, the urine will be found to contain albumen. Inflammation of the kidneys (nephritis) is apt to follow.

What to do.—The traumatic form is best treated by injections of cold water into the rectum, and by cold cloths laid over the loins. The idiopathic kind treat the same as albuminuria, (see preceding section), and rub mustard paste well into the loins.

VI. Cystitis, or Inflammation of the Bladder.

This is inflammation of the mucous membrane lining the bladder.

Causes.—Any derangement of the digestive organs is apt to change the character of the urine, making it acid and irritating, instead of alkaline, as it is in health. In other instances, cystitis is caused by eating poisonous plants, by calculi, and incautious use of diuretic medicines. Cantharides is peculiarly apt to cause it, either by being absorbed when spread over too large a surface of the skin, or by being given internally in too large doses.

How to know it.—By colicky pains, nose turned towards the flank, efforts to vomit, and, if a male, by the testicles being drawn up towards the body; the urine is passed with pain, and is albuminous; its flow may be either retarded or accelerated; there is evident constitutional disturbance and prostration; the fæces are often covered with blood; there is profuse perspiration; gastro-enteritis or nephritis may ensue; and death results from either rupture of the bladder or prostration.

The main feature on post mortem examination, is the inflammation of the lining of the bladder. There are signs of blood poisoning also,

usually in the purple spots, and the odor of urine is present throughout the entire body.

What to do.—Avoid oleaginous purgatives, resorting, in preference, to large quantities of linseed tea, or gum arabic water. Give recipe No. 8, and soothing injections. In short, adopt the same treatment as for nephritis. (See Section I.)

VII. Lithiasis, or Gravel.

Abnormal conditions of the urine, in which either an acid or alkaline condition exists to an excessive degree, predispose to the formation of sand-like deposits in the bladder, from the union of the acids or alkalies with the urea in a changed condition. The presence of these deposits excites the bladder to contract, and hence may be noticed the inclination to void the urine often, though in small quantities and slowly. The urination is, of course, quite painful. Sometimes particles of the deposit may be seen hanging to the long hairs around the external organ. Gravel is always more prevalent among males than females.

What to do.—Wash out the bladder with tepid water, which is easily done in case of the female. For the male it will be necessary to cut through the penis, as described for retention of urine. (See chapter on operations.) In order to dissolve the deposit, inject into the bladder a weak solution of hydrochloric acid, as follows:

No. 44. 1 Drachm hydrochloric acid,
½ Pint water,
Mix.

Give internally the following mixture:

No. 45. 20 Drops hydrochloric acid,
3 Drachms gentian,
1 Pint oat meal gruel,
Mix.

Give as one dose. Repeat it morning and night for a few days, and then change to the following:

No. 46. ½ Pound bi-carbonate soda,
4 Ounces gentian,
2 Pounds linseed meal,
Mix.

Give two tablespoonfuls morning and night. Continue this for two or three weeks.

VIII. Calculi, or Stones in the Bladder.

Calculi, like gravel, are the product of a mechanical union of small particles of phosphates, etc., that accumulate in the bladder and other parts of the urinary apparatus. They are most common in localities where the water is hard, as it always is on a limestone formation.

How to know it.—The symptoms are almost exactly identical with gravel. To verify the diagnosis, make a manual examination by the rectum; the stone can be felt in the bladder.

What to do.—The stone or stones must first be removed, by the method described in the chapter on operations. The subsequent treatment will be the same as for gravel.

CHAPTER VII.

DISEASES OF THE ORGANS OF GENERATION.

I. MALPRESENTATIONS, ETC., IN PARTURITION.——II. PROLONGED AFTER-PAINS.——III. RETENTION OF THE AFTER-BIRTH.——IV. ABORTION AND MISCARRIAGE.——V. UTERINE HEMORRHAGE, OR FLOODING.——VI. INVERSION OF THE WOMB.——VII. METRITIS, OR INFLAMMATION OF THE WOMB.——VIII. PUERPERAL FEVER, OR METRO-PERITONITIS.——IX. PARTURIENT APOPLEXY.——X. LEUCORRHŒA, OR WHITES.——XI. GONORRHŒA.——XII. MAMMITIS, OR INFLAMMATION OF THE UDDER.——XIII. SORE TEATS.——XIV. NYMPHOMANIA AND STERILITY.

I. Malpresentations, etc., in Parturition.

This, to the breeder at least, is the most important part of cattle pathology, aside from the contagious diseases. Oftentimes a valuable cow or calf, or both, are lost, when a knowledge of the subject would save them. A little timely aid, properly given, in a difficult case of parturition is invaluable, but if the assistance comes tardily, or is rendered in a bungling manner, the damage done may be irremediable and fatal.

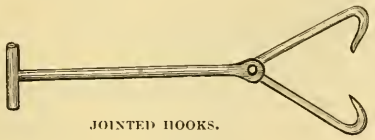
In order to be able to recognize a malpresentation, some degree of familiarity with the natural presentation, and its attendant phenomena, is necessary.

The period of gestation in cows is about nine months, sometimes a few days (or even weeks) more or less than this, but usually a few days more. The first calf, especially, is generally carried a few days longer. When the time for delivery approaches, the udder increases in size and fills, the vulva enlarges and thickens, the hips spread, and the space between the root of the tail and the joints of the haunch drops. The time being up, the cow endeavors to seclude herself and hide away from the others; the labor pains or throes come on gradually, increasing in force from time to time; in most cases, the cow lies down,—sometimes on one side, and sometimes on the other,—and occasionally stretches right out. The first object expelled is the water bag, which is usually about the size of a man's head; sometimes it breaks in the passage, at others it hangs unbroken, as low even as the hocks. The two fore feet next present, and then the nose lying between the feet. Three quarters of the labor is required to expel the head; the remainder, to pass the shoulders, after which the delivery is accomplished without further effort. The cow usually rises, and commencing immediately to lick the calf, in a very few minutes has him all licked off, when he dries quickly without chilling.

Unaided by the maternal instinct in this manner, the calf would be a much longer time in drying off, and in cold weather would become seriously chilled. The foregoing, as before intimated, is an outline of a natural case of labor, when "everything is right."

If the labor is severe and is prolonged more than half an hour, the cow should have help. The assistant should be the man whom the cow is accustomed to see; he should be very quiet and gentle in his movements, and have no spectators, neither human nor cattle. If in any case, a second person is present, there should be as little talking as possible. When the feet are properly presented, catch hold of them, one in each hand, and pull—not with anything approaching a jerk, but with a firm, even traction—at exactly the same time that the cow strains, and only at that time, relaxing the traction entirely during the intervals of quiet between the throes. Judgment and good common sense are required to manage a case well, and these must be the operator's main reliance; no printed directions can take their place.

In a case of malpresentation, the first thing to be done is to push the fœtus back out of the passage, in order to introduce the hand and arm



JOINTED HOOKS.

far enough to get hold of the parts that ought to come first, and so bring about a natural presentation. This is always a difficult task. If the cow is standing, the calf can be pushed back readily, but if she is lying down, the more fussing there is done the more the womb contracts, and the more difficult it becomes to push the fœtus in against the throes. The simplest, quickest, and easiest way is to fix a pulley and tackle around the cow's legs above the hocks and to something overhead, and by these

STRAIGHT HOOK.

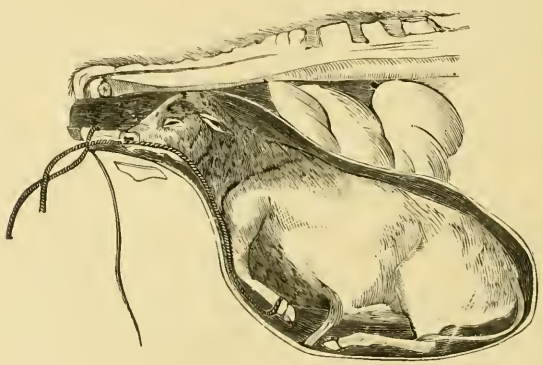
means to elevate the hind parts so that the operator can get at the case, and push back and "turn" the calf. When all the arrangements for delivery have been completed, let her down, and she will soon return to

the labor pains. Work as lively as possible while the cow is elevated; it is an unnatural position, and under very unfortunate circumstances, and if she is kept in it long at a time very bad results might follow.

The instruments necessary are a piece of soft rope, (the size of a man's little finger and about ten feet long), a jointed hook, straight hook, concealed knife, and embriotomy knife. The last named, is a small curved blade fastened to a ring that fits over the big finger, so as to carry the knife in the palm of the hand.

CONCEALED KNIFE.

First Malpresentation.—If one fore foot and the nose are entered in the passage and the other foot bent back, the calf cannot be delivered without first bringing up the retracted foot into its proper position, on account of the obstruction which the shoulder would offer. Tie a small rope around the foot presented, in order not to lose it: then push the



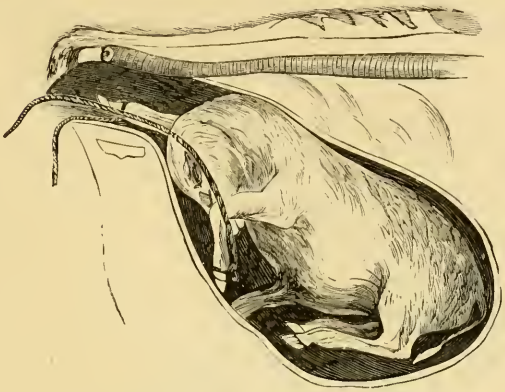
FIRST MALPRESENTATION.

One fore foot and the nose entered, the other foot bent back.

calf back, to allow the arm to be introduced and find the other foot; take in a noose of the rope, and put it over the foot as shown in the annexed cut; then—with the hand placed over the foot, so as to cover the toes, and thus prevent them from lacerating the womb—draw it up with the other hand. This accomplished, delivery will soon be effected.

Second Malpresentation.—When one foot is presented, the other foot and the nose being turned down, proceed in a manner similar to that just

described. Tie the rope to the foot presented, so as not to lose it, and

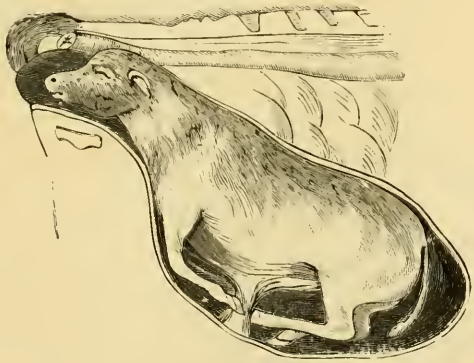


SECOND MALPRESENTATION.

One fore foot presented, the other foot, and also the nose, turned down.

bush the calf back so as to catch the nose and raise it into the passage; then get the other foot in the way directed for the first malpresentation.

Third Malpresentation.—When the nose is presented and both feet bent



THIRD MALPRESENTATION.

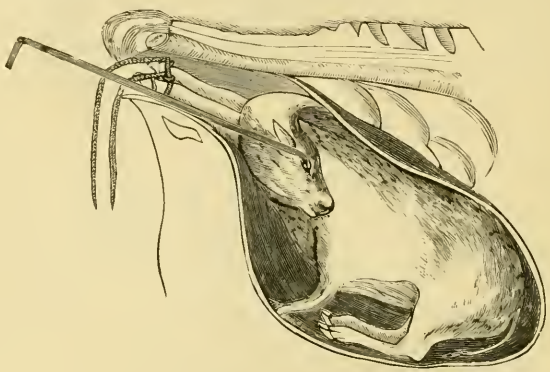
The nose presented, and both fore feet bent back.

back, the head may be entirely expelled, the neck being in the passage and the shoulders against the rim of the pelvis. If the fœtus remains

long in this condition, the head swells so as to render it utterly impossible to push it back, and the calf dies of course,—he is choked to death. In this extreme, the only feasible plan is to cut the head off, then push the body back and get the feet as directed for the first malpresentation. Such a case once occurred in the practice of the writer: it was managed in this way, securing delivery without trouble, and saving the cow.

The foregoing applies only when the head is swollen. When this is not the case, push the head back and bring up the feet as before described.

Fourth Malpresentation.—In this the fore feet are both presented, but the head is turned back against the side. Tie the rope to the feet, and carry a piece of it in, with a view of getting it into the mouth and



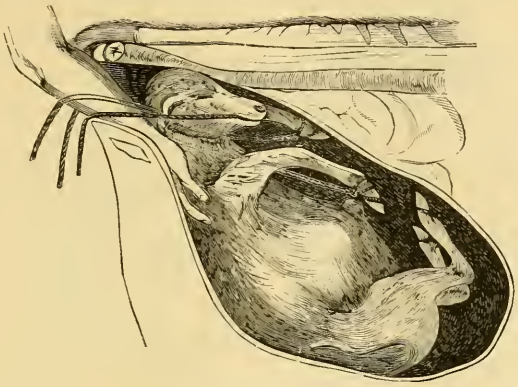
FOURTH MALPRESENTATION.

The fore feet in the passage, the head turned back on the side.

around one of the jaws. Failing in the latter effort, hook the straight hook into the eye socket, and then push the feet back, till the head can be brought into the passage.

Fifth Malpresentation.—Here, the fœtus is lying on his back, with the poll presented and the feet bent back upon the belly. Delivery may be made in this position, but the nose and feet must be brought into the passage first. To do this, pass in a noose for each foot, and another for the upper jaw, putting it in the mouth; then push the calf back, so those parts can be liberated and brought up. Carefully guard the womb from laceration by the toes, in all cases. When in a favorable presentation, let an assistant pull, while the main operator raises the withers of the fœtus over the rim of the pelvis.

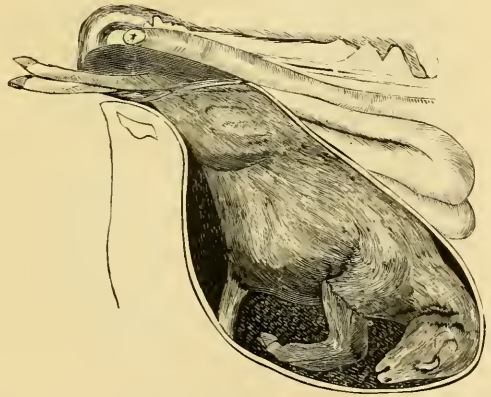
Sixth Malpresentation.—Both hind feet are in the passage, the calf's back being against the loins of the mother. Delivery is not necessarily



FIFTH MALPRESENTATION.

The fœtus on his back, with the poll presented, and both fore feet bent back.

difficult, but when once well started, it is very desirable to hasten it to the utmost limit of prudence, as there is danger of the calf suffocating.

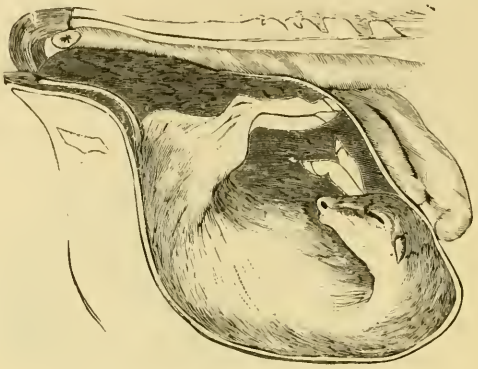


SIXTH MALPRESENTATION.

The hind feet both in the passage.

Seventh Malpresentation.—The breech is presented, and the hind feet are up against the cow's back. The feet must be drawn back into the

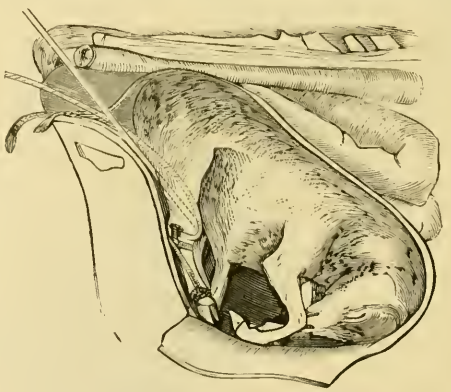
passage. Pass in the rope, take a noose around the hocks, and pull the fœtus down so as to get the noose around the feet and draw them back;



SEVENTH MALPRESENTATION.

The calf lying on his back, the hind feet up against the cow's back, and the breech presented.

this done, and the points of the buttocks being raised over the rim of the pelvis at the proper time, the calf may perhaps come without further



EIGHTH MALPRESENTATION.

The breech presented, with the back up against the loins of the mother, and the feet bent downwards.

trouble. But if otherwise, persevere, and turn it into the position seen in the cut for the sixth malpresentation. Failing in this, and as a last

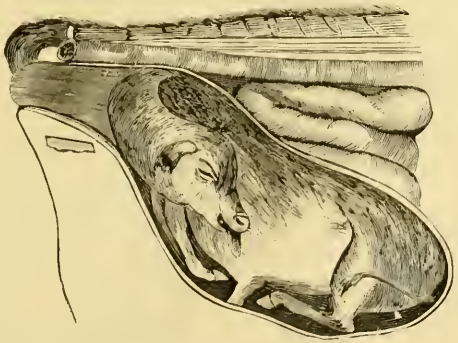
resort, it may be necessary to cut the calf up, and take him away piece by piece, with the concealed knife. The latter operation requires considerable skill, in order to avoid wounding the womb and vagina. It cannot safely be attempted, except by an expert.

Eighth Malpresentation.—This is a breech presentation in which the calf's back is up against the mother's loins, and the feet are bent downwards. This is considered to be the hardest position of all to rectify. Pass in the ropes, and take a noose around the hocks, and then around the feet; then, by elevating the cow very high behind and pushing back the fœtus, and drawing up the legs and feet into the passage, it can be delivered.

Ninth Malpresentation.—The neck is presented in the passage, the head being bent around to one side and the legs down against the belly. First, get the feet up as directed for the first three malpresentations; then turn the head into the passage, as directed for the fourth.

We need hardly say that before introducing the hand and arm, in any of the cases we have mentioned, they should be thoroughly anointed with lard or oil. The exact position of the fœtus should be determined beyond a doubt before attempting to change or "turn" it.

These nine malpresentations do not comprise all the difficulties attending parturition; for there may be abnormal developements of the fœtus,

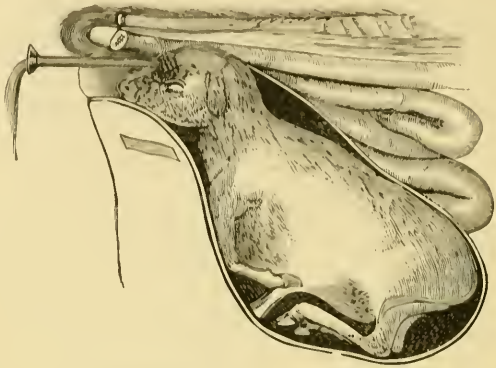


NINTH MALPRESENTATION.

Neck presented, with the head turned against the side, and both feet down.

rendering it a mechanical impossibility to effect its delivery alive. By far the most common phenomena under this head are hydrocephalus (dropsy of the brain) and ascites (dropsy of the belly.)

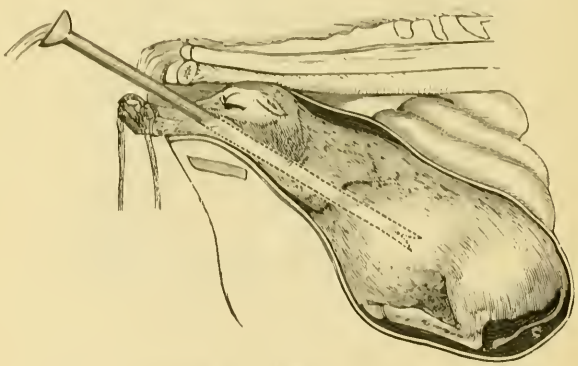
Hydrocephalus.—This occurs mostly in old, thin cows, but sometimes also in excessively fine-bred ones. The head must be tapped with the



HYDROCEPHALUS, WITH MALPRESENTATION.

trochar and cannula, thus evacuating the water; then crush in the skull, and deliver.

Ascites.—Carry in the concealed knife, and with it tap the belly and



ASCITES, OR DROPSY OF THE BELLY.

The presentation is natural.

let the water out into the mother's womb. If this is not successful, use a long trochar and cannula, as shown in the cut.

The cow dying, to save the calf.—In case of serious malformation of the cow, when all hope of saving her is given up, and the calf is still alive but cannot be delivered, resort should be had to the Cæsarian operation. (See chapter on operations.)

Some treatment,—or, rather, special care—is very necessary both before and after parturition. If the delivery is easy, a warm bran mash with a little salt in it is soothing and slightly nutritious. The cow should be dieted for a few days before calving, to loosen the bowels; if on hay, give roots and bran. Avoid having breeders too fat, the other extreme being just as bad. If too fat, puerperal fever is much more apt to follow; if too thin and weakly, the placenta is sure to be retained. Avoiding both these extremes, have them in middling flesh up to within a month of calving; then increase the feed up to within two days of that time, so as to have them in a thriving condition. If the cow is fat, it is a good plan to give, a day or two before, half a pound of epsom salts in a quart of water, to loosen the bowels.

If delivery is long and exhausting, give a pint of warm ale during its progress, and again afterwards. If the udder fills very full before calving, it is well to milk a little to relieve its painful tension. In all cases, milk the cow immediately after calving, while she is drinking her slop, and feed the calf, before he gets up, about a pint of the milk, giving the rest to the cow. It will act upon her as a healthful laxative. Inasmuch as the milk at this time is very different from what she ordinarily gives, there is very little danger of begetting the habit of milking herself.

The milk, at first, is rather thick and yellow, and is not fit to use for family purposes under three or four milkings. Some people indeed have a prejudice against using it under two weeks; nevertheless, except for drinking, it is good for all purposes after the third milking, provided there is no disease in the cow.

II. Prolonged After-pains.

These sometimes occur after protracted and painful delivery, from failure of the womb to contract, or from retention of the after-birth,—most commonly in weak, thin, old cows. For treatment, injections of cold water thrown up the vagina will usually suffice. They should not be allowed to continue, as they are apt to lead to inversion of the womb.

III. Retention of the After-birth.

When the placenta or after-birth is retained, mechanical means are necessary to remove it; for it becomes a foreign body as soon as the fœtus is delivered, and begins at once to decompose, and the impure matter being absorbed into the circulation, the general health of the animal suffers decidedly.

It is best to let the placenta remain till the end of the second day, or

beginning of the third, to soften a little. It may then, perhaps, come away of its own weight; if not, it is easily removed by inserting the hand and arm to the shoulder, and then with the other hand, applying gentle traction to the hanging membrane; at the same time take each cotyledon or button by which the placenta is attached to the womb, in turn, and by pinching it a little between the thumb and fore finger, it will detach from it, much as in unbuttoning a garment. Great care is required not to pull off one of these cotyledons, or the resulting hemorrhage might prove fatal. If, however, this should be done by mischance, cold water thrown over the loins will be the proper treatment.

IV. Abortion and Miscarriage.

Premature expulsion of the fœtus is called abortion in the earlier periods of gestation, and miscarriage or premature labor in the later ones. It not infrequently takes on an enzoötic character, and by running through a whole herd entails enormous loss on the stock owner. This tendency, as was remarked in Chapter I of this Part, is stronger among cows than any other of the domestic animals. It is usually explained by attributing it to sympathy, using the word pathologically. By some, however, it is regarded as strictly the result of contagion. If so, the contagious principle must be in the smell of the discharges that follow; for the sense of smell in horned cattle is very acute, and is apparently in very close connection with the nervous system.

Causes.—The most common causes are accidents, or violence of some kind,—being hooked and pushed about by other cattle, or kicked and clubbed by brutal herdsmen; jumping, leaping, falling, etc. Some suppose it to be caused, in many cases, by ergot in the hay or other fodder, such as has been badly harvested or grown in a wet season, especially on low, swampy ground.

How to know it.—There will be dullness, suspension of rumination, anxiety in the countenance, separation from companions; at length, a small water bag will be passed, and a little later a fœtus. Or, perhaps, all that may be noticed, to indicate something wrong, will be a tiny fœtus found somewhere. More or less discharge will follow. It will be of a bloody, mucous character, and is likely to become purulent after a few days.

Treatment.—For the original case, (in which the mischief is nearly always completed before discovered), nothing special can be done, except to syringe the parts out well with tepid water, and follow this with a carbolic lotion, viz:

No. 47. ½ Ounce carbolic acid,
½ Gallon water,
Mix.

Inject a little twice a day. Continue it a week or more.

Prevention.—This is really the important point. Isolate the cow that has aborted immediately, and with the above treatment very likely the bad effects of her example will be arrested. Otherwise, some of her companions will probably abort from two to six weeks later. As general precautions, prevent violent commotions among the cows when out of the stable, and never allow them to be run by boys or dogs, but drive them as quietly as possible. Always shut up a cow when bulling; her jumping on the others, or, instead, being ridden by them, is apt to injure them and her alike.

The feeding of hemp seed deserves considerate attention, owing to the experience of recognized authorities on breeding. It is given in pint feeds once a day, with other food, from the time immediately preceding the bulling season through four or five months. As to the general diet, feed well so as to keep cows in good, strong condition, but avoid obesity.

V. Uterine Hemorrhage or Flooding.

Bleeding from the womb or vagina sometimes follows protracted labor, from injuries to those parts by carelessness or accident during parturition; or it may result from unskillful removal of the placenta. The continuance of bleeding is due to the failure of the womb to contract, as it should do, after delivery. It is called flooding on account of its coming away in such large quantities, the womb-full being evacuated at a time.

What to do.—Throw cold water, by the bucketful, over the loins; cool the hand and insert it into the womb, which will sometimes cause the latter to contract upon it. If these means prove insufficient, inject cold water into the womb, with a suitable syringe.

EXAGGERATED ILLUSTRATION OF UTERINE HEMORRHAGE.

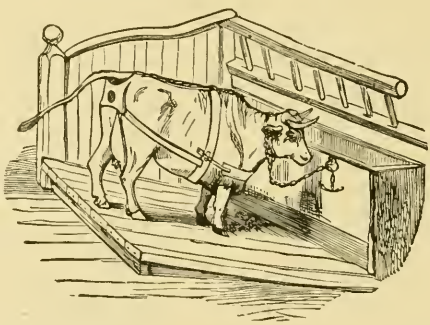
VI. Inversion of the Womb.

Following immediately upon parturition, after-pains sometimes come on so violently that the womb is forced right out through the vagina, and is turned inside out, and lies or hangs behind the cow a pink, bag-like substance covered with cotyledonous (mulberry-like) excrescences all over the surface.

What to do.—If dirty, take it up on a clean sheet, and wash it with tepid water with a little alcohol in it—a wineglassful to a pint of water. (If the placenta is still attached, remove it as directed in Section III.) Sponge it over with laudanum, and carefully return it. This is an

exceedingly delicate task, though not difficult otherwise; the utmost care is necessary to avoid punching the fingers right through the membranes, which would cause death. Find the most dependent portion, then place the clenched fist beneath it, and let the womb fall down over the hand and arm as it is raised; and, with the parts in this position, promptly insert the arm at full length into the body of the cow, being very careful not to use undue violence. The uterus will generally suck down into its proper place without any difficulty, but if necessary to manipulate the walls of the vagina somewhat, this may be done—always with extreme care and

INVERSION OF THE WOMB.



TO PREVENT INVERSION OF THE VAGINA.

the minimum amount of force that will accomplish the object. Then place the cow in a stall where the hind feet will be at least six inches higher than the forward, and apply a harness and compress over the external opening, as shown in the annexed cut. Or a rope, twisted as shown in the smaller cut, may be used, the object, in either case, being to prevent a recurrence of the displacement.

TWISTED ROPE.

To tie over the vulva, and thus prevent inversion of the womb.

If straining is violent and continues any length of time, give internally the following mixture:

No. 48. 1 Ounce chloral hydrate,
1 Pint water,
Mix.

Give as one dose; if necessary, repeat it in half an hour.

VII. Metritis, or Inflammation of the Womb.

This affection is not very often seen in the cow, owing to her phlegmatic temperament, and her proneness to other complications, arising at an earlier stage, in connection with parturition. It is the result of injuries to the womb during difficult parturition; it may develope also from a cold caught at that time. The inflammation soon extends and involves other parts, making a very serious condition indeed. See further in the next section.

VIII. Puerperal Fever, or Metro-Peritonitis.

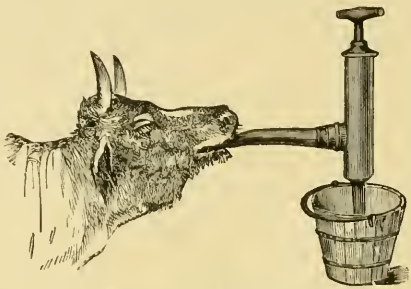
This disease is often confounded with parturient apoplexy, so that, notwithstanding the difference between the two conditions, they are mistaken one for the other. Puerperal fever is erysipelatous inflammation of the uterus and peritoneum, and may affect cows of all ages. The antecedent facts will usually be found to be difficult parturition, exposure to cold storms or extremes of temperature, retention of the placenta, or overdriving prior to calving, and the like circumstances. Thin, poor cows that have been changed suddenly from a dry, short pasture to rich succulent feed at or near the time of calving, are especially apt to have it. It may come on at any time from a few hours after calving up to the third or fourth day.

How to know it.—High fever, with all of its attendant symptoms, such as dry, hot nose, horns and extremities hot or cold; capricious appetite, with rumination suspended; colicky pains; kicking at the belly; getting up and lying down frequently,—sometimes, remaining on the knees several minutes. The head is turned towards the flanks; the pulse is quick, hard and wiry; the respirations are accelerated, short and confined to the thorax, so as to avoid moving the abdomen as much as possible; the belly is tucked up, the urine is scanty and high colored, and usually there is constipation. All the symptoms, and especially the belly pains, increase; prostration comes on; finally, stupor (coma) sets in. Death soon follows.

Post mortem examination shows all the evidences of inflammation of the womb and peritoneum, with purple spots here and there; and the brain is visibly affected, showing ecchymosed spots, etc.

What to do.—Give recipe No. 26, and supplement its action with injections of soap and water. Give No. 42 every two hours, till the pulse is improved. If in the very early stages, a little blood may be drawn, but this is not allowable after the first day. If the stupor comes on before the purgative can be gotten down, give the latter through the stomach pump, to avoid the danger of letting it run down into the lungs. Apply

blisters—mustard paste or flies—to the belly. If no symptoms of purgation show themselves in eight or ten hours, inject No. 40 under the skin every half hour till the bowels have moved. If constipation is still obstinate, a pint of tepid water may be injected into a vein.



USING THE STOMACH PUMP.

Manner of giving medicine or food during stupor.

Convalescence will be indicated by a return to sensibility, cessation of pain, purgation, copious secretion of urine of a good color, and a return of strength. When these symptoms are noticed, give No. 19, repeating it three or four times a day.

IX. Parturient Apoplexy.

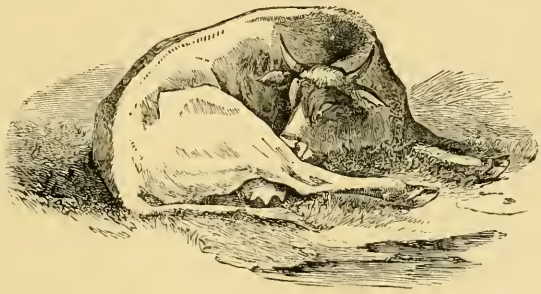
This is a blood disease affecting cows of a plethoric habit at time of calving. It is never seen following difficult or protracted labor, uterine hemorrhage (flooding), abortion, nor the retention of the placenta. There must be a constitutional tendency to congestion of the brain, coma and apoplexy. The first attack is usually fatal; even if not so, the trouble is very likely to recur at the next or some subsequent calving.

How to know it.—There is at first a staring, wild look about the eyes, disinclination to move, loss of milk, and increased temperature; but these symptoms are seldom so marked as to attract special notice. They are followed by a staggering gait and weakness across the loins, till suddenly the animal falls, when the eyes are found to be bloodshot and glassy, the pupils dilated and the lids twitching. The mucous membranes become purple; she gets perfectly blind and comatose (stupid); the head is usually turned back to the side; the pulse gets gradually slower, fading into imperceptibility; the breathing is slow and stertorous. In this stage the pupils contract, the temperature falls decidedly, sometimes as low as 95°. The udder becomes hard and unyielding; the paunch fills with

gas, causing marked interference with the breathing; convulsions set in, and death soon follows.

The post-mortem shows a fat, full body, blood vessels full of fluid, black blood, and purple spots on the brain and spinal column and in other parts of the body. There are many other abnormal appearances in the brain, most of which can only be distinguished by an expert.

What to do.—Prevention is the main thing. If the cow is manifestly plethoric, give light, soft diet, with laxatives (No. 8 is excellent) once or twice a week for three weeks before calving. When the attack comes, if the cow is seen in the first stage, when the pulse is always full, bleed freely, and give recipe No. 26; after two hours give No. 20, repeating the latter every two or three hours as long as necessary. Give injections also every few minutes. Apply cold water and ice to the head, and heat in



PARTURIENT APOPLEXY.

the form of hot rags, hot smoothing irons, etc., to the body. If the purgative does not work, give a hypodermic injection of No. 40, repeating it every two hours. If these means fail, open the jugular vein, and inject a pint of clean, tepid water. During convalescence, treat the same as for puerperal fever. If she recovers, do not breed her again, but sell her to the butcher; for, as before mentioned, it is almost certain to occur again, and at no distant day to end in death.

If it is necessary to give any drenches during the coma, use the stomach pump, to guard against turning them in upon the lungs.

X. Leucorrhœa, or Whites.

This is catarrh of the vagina and womb, with a chronic discharge of a muco-purulent, white fluid that hangs around the vulva and tail, and has a very offensive odor. It is not attended with serious constitutional disturbance, but sometimes causes nymphomania or "bullers." Such cows rarely breed, and even if they do so, are apt to abort. Sometimes the discharge is so profuse as to keep the cow poor.

What to do.—Syringe out the parts with tepid water, and inject lotion No. 47, repeating this twice a day. Feed on nutritious but light diet, and give No. 21 in the feed.

XI. Gonorrhœa.

This is catarrh of the generative parts of the bull,—little ulcers or chancres in the sheath and on the penis, with a whitish discharge, which is chronic.

How to know it.—Painful urination is the most characteristic symptom; with all his frequent efforts, only a few drops are passed, and those not without great uneasiness, which is further manifested by his stepping forward and back or from side to side, and by raising the hind feet, lashing the tail, etc.

What to do.—Suspend all service, and give him the laxative recipe No. 8, and when the bowels return to their normal condition give No. 21 in the feed, repeating the latter morning and night, for three or four weeks. Draw out the yard with soft linen cloth, and bathe all affected parts with the following lotion:

No. 49.
4 Ounces spirits of camphor,
1 Ounce sugar of lead,
2 Drachms sulphate of zinc,
1 Quart soft water,
Mix.

Continue the application, once a day, till cured, and do not let him serve a cow, for the reason that it is contagious. If any chancres are seen, touch them once a day with lunar caustic. Feed on green food, if possible.

XII. Mammitis, or Inflammation of the Udder.

This is most common after a parturition which occurs before the secretion of milk has assumed a normal condition, especially in the case of heifers at the first calving. Sometimes, it has no connection with calving, but is contracted by lying on cold, damp ground, or in the case of middle-aged and old cows, develops in hot weather, taking on the form of garget or curdled milk. Cows in high condition are the most subject to it, the attack being usually induced by driving them until overheated.

The inflammation, in some cases, will subside and go away, and the milking function go on as before with very little loss; in others, it goes on to suppuration in one or more quarters of the bag, or even to mortification.

How to know it.—The type of mammitis that takes on the active inflammatory character is ushered in with a shivering fit, which is succeeded in a short time by fever and dullness. The bag becomes hot and hard, red, swollen and sore. It being so painful to the touch, the cow is very

averse to being milked. The milk is often curdled, and sometimes bloody. The trouble may stop here and terminate in resolution, or it may go on to suppuration, the pus in some cases discharging inside and coming away with the milk, and in others through an opening on the outside. Again, it may not suppurate at all, but become indurated and remain permanently enlarged, or gangrenous and slough off.

The milder type of mammitis, that which is not connected with parturition, but is simply curdled milk or garget, yields readily to treatment.

What to do.—If dependent upon calving, and the cow is fat and feverish, give recipe No. 8. Foment the bag with hot water several times a day, and as often as three or four times a day remove the milk that does form, and apply the following lotion:

No. 50. 4 Ounces gum camphor,
1 Pint olive oil,
Mix.

Rub well in three times a day. If the inflammation does not go out by the time purgation ceases, give No. 19, repeating it morning and night for a week or two. If the case goes on to suppuration, and it breaks on the outside, foment the bag, and inject recipe No. 9, two or three times a day. In all cases where there is much swelling, support the bag by a bandage passed around the body over the loins. If a quarter sloughs off, dress the wound with No. 9, and give internally the following:

METHOD OF SUPPORTING THE UDDER.

No. 51. 1 Ounce sulphate of soda,
2 Drachms nitrate of potash,
Mix.

Give as one dose in a bran mash, and repeat it morning and night for a week or two. Isolate the patient, on account of the smell.

When it is merely a case of curdled milk (garget), give a tablespoonful of saltpetre night and morning in a bran mash, and milk her with special care, to make sure of getting all the milk away.

XIII. Sore Teats.

Cows' teats are very apt to become chapped, cracked and very sore, rendering the milking exceedingly painful to the cow and very annoying to the milker. Unfortunately, the latter is often so thoughtless as to fly into a passion and abuse the cow. Great patience and kindness should always be exercised in such cases, the milker taking plenty of time to soften the sore teats well with the milk before attempting to squeeze them.

When done milking, anoint them nicely with the following mixture:

No. 52.
1 Ounce alum.
1 Drachm carbolic acid.
4 Ounces lard.
Powder the alum and mix.

Or, instead, this may be used:

No. 53.
½ Ounce tannic acid.
1 Drachm carbolic acid,
4 Ounces lard.
Mix.

Little pea-like tumors sometimes grow in the milk passage, in the teat, eventuating, in some cases, in its complete obstruction, and the subsequent loss of that quarter. Many expedients have been tried for the cure of this troublesome condition—such as teat siphons, probes, bistouries, needles, etc.—but all to no avail, for the teat very soon gets sore, and milking becomes dangerous, if not well-nigh impossible. The only feasible way of managing the case is just to let it go till the cow goes dry, milking that quarter as well as possible without any instrumental aid; and then to cut into the teat, remove the excrescences, and let the wound heal over a silver probe. If this is properly done, the teat will be as good as ever.

XIV. Nymphomania and Sterility.

Nymphomania is chronic inflammation of the clitoris, giving rise to a constant desire for the male. Such cows take the bull at any time, but rarely conceive, and even when they do so, are almost sure to abort. They are called "bullers." It often happens that they are barren naturally, twins being especially prone to that condition. Sometimes, high bred cows will not breed to a high bred bull, yet will do so to a mongrel, especially a young bull.

What to do.—For cows naturally barren nothing can be done. For others the difficulty can often be overcome by reducing them in flesh (for they are nearly always fat), and by judicious management. Keep them in a short pasture for a few weeks, and give them a handful of Glauber's salts every second day. At the proper time, put them to a young, vigorous bull, one or two leaps being sufficient. If this does not succeed, try a mongrel bull. If the cow is continually riding the other cows, keep her to herself, if possible, and feed from half a pint to a pint of hemp seed once a day for two months. In some cases hemp seed seems to have a magic effect. Feed it both before and after the service—beginning say three weeks before coming in heat, and continuing it right along till she conceives. If the cow is thin in flesh, fatten her up a little, even if she has to be shut up to do this.

CHAPTER VIII.

DISEASES OF THE NERVOUS SYSTEM.

I. PHRENITIS, OR INFLAMMATION OF THE BRAIN.——II. APOPLEXY.——III. EPILEPSY.——IV. PARALYSIS.——V. TETANUS.——VI. RABIES OR HYDROPHOBIA.——VII. NERVOUS DEBILITY AT PARTURITION.

I. Phrenitis, or Inflammation of the Brain.

This distressing disease, which is most common during the summer months, may be either idiopathic (primary disease) or symptomatic. It may result from fever, or from inflammation in some other part, its immediate cause being too great a flow of blood which presses on the temporal arteries, and causes increased action in all the circulatory vessels.

How to know it.—There will be strong pulsation in the temporal arteries, constant watchfulness, and finally raving. The eyes are inflamed; the animal will fall suddenly, soon rising again, however; there will be trembling and starting of the tendons; the skin will be harsh and the urine suppressed. In a more unfavorable stage, there will also be grinding of the teeth, and total want of rest. Really idiopathic phrenitis is rare. It is generally caused by acute indigestion, impaction of the omentum, and other local troubles.

What to do.—The treatment consists of a good cathartic, as, for instance, No. 8, the effect of which should be assisted by injections of warm water and soap.

Bleed from the jugular vein; keep the head cool by means of ice or very cold water; and if the limbs are cold, use mustard or strong embrocations of ammonia. Aconite is also considered beneficial, but it should never be used except under the direction of a veterinarian. During recovery, the animal should be kept quiet, and have good nourishing and easily digested food.

II. Apoplexy.

In true apoplexy, the animal drops suddenly, and death ensues very soon, unless immediate relief is given. The means to be used are bleeding from the jugular vein, and the administration of a purgative, such as No. 8, with injections of soap and water. Give a change of food.

III. Epilepsy.

Epilepsy is rare, except in the case of young animals. There will be severe convulsions, followed by stupor, with foaming at the mouth. The

heart beats are strong and violent. The visible membranes are heightened in color, and either dangerous lethargy supervenes, or the animal quickly recovers. Recovery is seldom so perfect, however, that the animal will not be subject to other attacks.

What to do.—Dash cold water over the head and face, and when the attack subsides, give good food and special care, with such remedial measures as may be indicated by the general state of the system, as, for example, indigestion or constipation.

IV. Paralysis.

In those rare cases where paralysis exists as a distinct affection, death usually occurs very soon. Its most common forms are those known as *paraplegia* and *hemiplegia*. The former is when the whole fore or hind parts are affected; the latter, when one side of the body only is so. Paralysis is a loss of voluntary movement, and usually occurs as a symptom of other diseases, as softening of the brain, effusions of fluid thereon, etc.

What to do.—Give recipe No. 8, supplementing it with the following:

No. 51. 2 Drachms nux vomica,
½ Ounce saltpetre,
Mix.

Give as one dose; repeat morning and night for a month.

V. Tetanus or Lockjaw.

Tetanus is a general and continued spasm (or, more strictly, contraction) of the muscles of the body, both voluntary and involuntary. When the muscles of the jaw are principally affected it is called *trismus*, or in popular language, lockjaw, the term tetanus being more properly limited to the general form.

Causes.—There are two forms of this disease, one (traumatic) arising from local causes, as a prick or injury to the foot. The other (idiopathic) form, though often of obscure origin, has been known to arise from bad food, and exposure. Either form may follow castration.

How to know it.—The disease is insidious in its operations, until the dangerous stage comes on. The animal may be dull, off its feed, and generally disinclined to move. Then the whole body may become affected, with the hind legs wide apart, the nose protruding, head and tail elevated, breathing quickened, and the pulse frequent and corded. The bowels are strongly bound. Sometimes the back is depressed downward, and sometimes arched up; and sometimes the spasm throws the head to one side. There are different technical names for these several manifestations.

What to do.—Little can be done, except to remove all irritating objects, give calming medicines, and operate on the bowels as soon as possible. The nervous excitment will be lessened by keeping the patient in a dark place.

VI. Rabies or Hydrophobia.

It seems needless to repeat the general statements respecting this disease given in Part II of this work, pages 398 and 399. It is, of course, incurable, and from its exceedingly dangerous nature, the suspected animal should be immediately confined, and killed as soon as ever the symptoms become pronounced.

VII. Nervous Debility at Parturition.

This disease must not be mistaken for parturient apoplexy or peritonitis. It is readily distinguished from these by the total absence of any tendency to either high fever or lethargy. It is not confined to animals in high condition, but is found quite as often among those that are lean.

How to know it.—The pulse may be somewhat fast, but will be compressible and often weak. The udder remains soft, and the milk is plentiful and easily drawn; and though there may be constipation, the appetite will be good.

What to do.—Keep the animal warm and in good quarters, with plenty of bedding. Evacuate the bowels by warm injections, at the same time giving a mild purgative, No. 8. Give stimulants, sloppy but nutritious food, hay tea, etc., and remove the milk frequently from the udder.

CHAPTER IX.

DISEASES OF THE SKIN.

I. SIMPLE ECZEMA.——II. CHRONIC ECZEMA, OR PSORIASIS.——III. ERYSIPELAS.

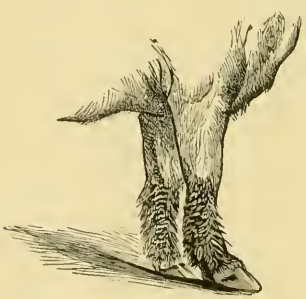
I. Simple Eczema.

This is a skin disease in which crops of vesicles come up, burst, run a little watery matter, dry up and heal, but while these are healing another crop breaks out in another place. It is attended with intense itching, which worries the animal exceedingly.

What to do.—Give a purgative, No. 8, repeating it after a week; also, a change of food and good care. Let the cattle have salt at least twice a week. Bathe the affected parts frequently with lotion No. 47.

II. Chronic Eczema, or Psoriasis.

When simple eczema is neglected the disease becomes chronic. The skin thickens, gets hard, dry and sore, and cracks into fissures or furrows; the discharge continues and becomes greasy, offensive and ichorous; and the hair gets thin and stands straight out, or perhaps turns the wrong way, giving the parts the appearance of rat tails, by which name the disease is often known. It is very troublesome, frequently causing lameness, and always proving hard to cure.



CHRONIC ECZEMA, OR "RAT TAILS."

What to do.—Apply hot linseed meal poultices to the affected parts till all inflammation and soreness are gone; then embrocate freely with lotion No. 9, using a cotton bandage wet in the lotion and applying it loosely. If there are any points of proud flesh, burn them down daily with lunar caustic. When all soreness is gone and the disease appears to be under entire control, apply either of the ointments Nos. 52 and 53.

III. Erysipelas.

This is a diffuse inflammation of the whole thickness of the true skin, sometmes extending to the subcellular tissue, and causmg much pain and irritative fever.

How to know it.—It is indicated by an intensely red skin, there being, moreover, no disappearance of color under pressure. The parts are hard and internally red, but not severely swelled, but the cellular tissue is injected and infiltrated, often inclining to a pustular state. The disease terminates in resolution, suppuration or ulceration—sometimes even in mortification and gangrene. If the head is attacked, there is danger of a fatal termination.

What to do.—If there is symptomatic fever and the animal is fat, depletion is necessary,—give No. 8; but if the animal's condition is the reverse of this, give No. 13. Follow this with nitre, in half ounce doses, twice a day. In connection with the above constitutional treatment, there should be local applications to the inflamed part, such as lotions of lead or zinc. A strong solution of nitrate of silver is sometimes applied, and with decided benefit, to the outer edge of the inflamed parts. A poultice of ripe cranberries is probably one of the best remedies for reducing the inflammation, if applied early. It is to be followed with glycerine in which a small quantity of ammonia has been dissolved, or with recipe No. 1.

CHAPTER X.

PARASITIC DISEASES OF CATTLE.

I. HOOSE OR HUSK (VERMINOUS BRONCHITIS).——II. THE GADFLY AND GRUB (ŒSTRUS BOVIS).——III. LICE.——IV. TAPEWORM.——V. MANGE.——VI. RINGWORM.

I. Hoose or Husk (Verminous Bronchitis.)

The symptoms of this disease are similar to those of bronchitis. The difficulty is caused by a species of *strongulus*—worms—(*filaria bronchitis*) the eggs of which are swallowed in grazing. Calves, and especially sheep, are the most likely to be affected, for the reason that they bite closer than cattle.

How to know it.—There will be a slight, husky cough, recurring at irregular intervals. The coat will soon become staring, and the breathing more and more embarrassed. The cough becomes more frequent, and in character more suffocating and mucous; worms, either singly or rolled together, will also be coughed up.

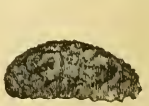
What to do.—Feed liberally with the soundest and most nutritious diet possible, including linseed or cotton cake, and roots, mixing in the food some good tonic, such as recipe No. 4. For calves, make four doses of the recipe. Burn turpentine on pine shavings in the pen with the calves, and let them breath the fumes, and give them a tablespoonful of sulphur in the food once a day for two weeks.

Prevention.—This is better than cure. The forms from which *filaria bronchitis* emanate are found in low, wet, undrained pastures. Hence, keep the stock off such pastures when the trouble is found, especially when wet with dew or rain. Do not allow animals to drink from stagnant ponds or pools, and look to the proper drainage of the pastures.

II. The Gadfly and Grub (Œstrus Bovis).

Little rounded tumors will often be found along the backs of cattle, during late winter and spring. These are called warbles, and are the lairs of the larvæ of the ox gadfly (*œstrus bovis*). Each tumor contains a grub, which may be squeezed out by pressure, sometimes escaping with such force as to fly several feet. Sometimes it is necessary to enlarge the orifice with

OX GADFLY (ŒSTRUS BOVIS.)

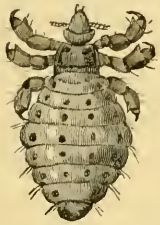


GRUB OF GADFLY.

the lancet, for the more easy expulsion of the grubs. The cuts show the two forms of the insect,—the perfect fly and the grub.

III. Lice.

Various species of lice infest the ox, the principal being the ox louse proper, the calf louse, (both of which are species of *Hæmatopinus*, or blood suckers), and a certain kind of bird louse, one of the tribe of

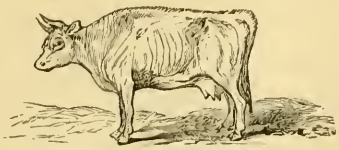


OX LOUSE.

CALF LOUSE.

BIRD LOUSE.

Trichodectes, having no sucking tube, but with strong biting jaws. The cuts show all these parasites, of course very much enlarged.



APPEARANCE OF A COW AFFECTED WITH LICE.

There are also ticks infesting cattle at certain seasons, and especially plenty on Texas cattle. By many, indeed, they are supposed to be the exciting cause of Texas fever; and while this opinion is doubtless erroneous, it is not at all improbable that these ticks, which especially infest pastures traveled over by Texas cattle not wintered north, really do assist in poisoning the blood of native cattle in some degree. The accompanying cut shows the ox tick.

OX TICK.

What to do.—The remedy for ticks consists in careful currying and

picking them off. For lice on cattle the following will be found among the best remedies in use:

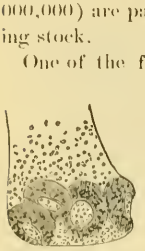
No. 55. ½ Pound of tobacco,
1 Gallon of water,
Steep for two hours.

Wash the affected animal with this infusion thoroughly, using it warm.

IV. Tapeworm.

It is not necessary here to go into a dissertation on the tapeworm. The microscopic eggs (a single worm is estimated to lay as high as 25,000,000) are passed with the exuviæ of dogs, and are taken up by grazing stock.

One of the forms in which it exists in cattle is the cystic, found in the muscles. The parasite which is the mature tapeworm is found in the bowels of the human family, and in animals, especially dogs. The cut shows the head of a tapeworm of the species known as *tænia mediocanellata*.



HEAD OF TAPEWORM GOT BY EATING BEEF.

Prevention.—Prevention of the parasites in the immature form in stock consists in destroying all exuviæ of dogs in pastures, wherever found. Once encysted in animals, there is no remedy. For prevention of tapeworm in the human family, eat no meat, not even smoked meat, without thorough cooking.

V. Mange.

There are a number of parasitic insects which attach themselves to ill-conditioned cattle, producing itching. The latter is intensely aggravated in hot weather. A species of *dermatocoptes*, similar to the itch or scab insect, is the most prolific cause of this class of affections. There is also a microscopic insect, the *gamasus* of musty hay, which sometimes infests the skin of animals feeding thereon. The cut shows the last named insect highly magnified. Treat about the same as for mange in the horse. (See page 435).

GAMASUS OF MUSTY FODDER.

VI. Ringworm.

This is somewhat common in cattle, showing as a greater or less number of round bald spots, covered with white scales, and surrounded with bristly or split hairs which are scabbed around the roots, with some eruption on the skin.

The microscope shows it to be a vegetable parasite. It is readily transmitted from one animal to another.

What to do.—Clip off the hair, and wash the part with soap and water, to remove all scabs; when dry, rub in well a little of the following:

No. 56.
2 Ounces tincture of iodine,
1 Ounce oil of tar,
2 Ounces glycerine,
Mix.

Repeat the application once a day until cured. Or, instead, the following may be used in the same way:

No. 57.
1 Ounce solution iodo-bromide of calcium compound,
3 Ounces water,
Mix.

Rub well in once a day.

CHAPTER XI.

DISEASES OF THE EYE.

I. OPHTHALMIA OR CONJUNCTIVITIS.——II. FUNGUS HÆMATODES, OR BLEEDING CANCER.——III. TORN EYELIDS.——IV. INVERSION AND EVERSION OF THE EYELIDS.——V. FOREIGN SUBSTANCES IN THE EYE.

I. Ophthalmia or Conjunctivitis.

As a rule, cattle are subject to but few diseases of the eye, the most common being simple soreness or inflammation of the conjunctiva (lining of the lids), from the introduction of foreign bodies, exposure to cold winds, scratching of thorns, or blows from horns of other cattle, or else from kicks or some similar violence on the part of the attendants.

How to know it.—There is swelling and congestion of the lids; weeping, the tears running down over the cheek; shaking and hanging of the head; refusal of food; suspension of rumination, etc. On examination, it will be found that the eye is kept closed or nearly so, and is very red; and the small blood-vessels of the eye-ball are enlarged and injected. The inflammation may extend to the internal parts of the eye, and pus may gather and fall to the bottom of the anterior chamber, forming a whitish yellow spot. Cataract may result from this, or, at least, opacity from the formation of a white film over the surface of the eyeball (cornea).

What to do.—Give a mild purgative, No. 8. Bathe the eye with warm milk and water, half and half, several times a day, and apply the following lotion with a camel's hair brush directly to the eyeball and all other parts, several times a day.

No. 58. 2 Grains sulphate of atropia,
1 Ounce water,
Mix.

After the active inflammation is subdued, apply the following lotion in addition to the other treatment, which should still be continued:

No. 59. 10 Grains nitrate of silver,
1 Ounce water,
Mix.

Apply directly to the eyeball, morning and night, with a camel's hair brush. Continue this till all opacity is gone, that is, till the white half-moon spot at the bottom of the anterior chamber is absorbed.

II. Fungus Hæmatodes, or Bleeding Cancer.

This is a cancerous growth that may develop on any part of the body but is especially apt to come in the eye, destroying that organ, and forming a large, spongy, fungus-like excrescence that bleeds upon the slightest injury, in fact almost upon a mere touch.

FUNGUS HÆMATODES.

What to do.—When the exact nature of the disease is recognized, the eye should be dissected out, and the animal fitted for the butcher as speedily as possible. The operation is the same as that described under "Extirpation of the Eye" in the Horse department. (See page 456).

III. Torn Eyelids.

As in everything of the nature of a "blemish," an injury to the eye is of less consequence in cattle than in the horse. Still, both humanity and self-interest dictate that it should not be neglected. In a case of torn eyelids,—an accident that may happen in various ways,—bring the edges neatly together, and sew them with fine silk. Dress them afterwards with a weak carbolic or other healing lotion, applying the same two or three times a day as long as necessary.

IV. Inversion and Eversion of the Eyelids.

These are more of an annoyance than a serious ailment, and are not of very frequent occurrence in cattle. Their technical names are *entropium* and *ectropium*, respectively, under which they have been described in the Horse department, on page 428, to which the reader is referred. They are identical with what oculists are often called on to treat in the human subject.

V. Foreign Substances in the Eye.

Hayseed, hair, or other foreign particles in the eye always occasion great annoyance, and often real suffering, which the animal will manifest by keeping the eye partly closed, and perhaps by turning the head slightly awry. Anything of this kind should be removed at once, the head being well secured, so that the operator will run no risk of injury from the horns. The method of procedure, as also the subsequent treatment, will be similar to that described on page 424 for the horse.

CHAPTER XII.

ACCIDENTS, ETC.

I. CHOKING.——II. FRACTURES.——III. WOUNDS.——IV. DISLOCATIONS.——V. SPRAINS.——VI. WENS.

In this chapter we shall treat of the more common accidents, such as every stock-man is called on to face more or less frequently every year. They often require immediate attention, and even if a veterinary surgeon is within reach it will in many cases be very desirable to take a half dozen stitches or so, while waiting for him.

I. Choking.

This is a common accident where roots are fed, and it may happen on any farm in the fall, if the cattle have access to apples, etc. The imperfectly chewed turnip or apple sticks in the gullet, (which in cattle is small), and resists all the animal's efforts to dislodge it.

How to know it.—There is always tympanitis; the head is extended and neck stretched out; saliva drools from the mouth; the animal manifests restlessness and pain; she keeps chewing and making frequent efforts to swallow; and an anxious expression is seen on the countenance. Death may follow, either from suffocation or from rupture of the diaphragm.

What to do.—Ascertain if the object is in the throat or neck, and if it is, place a balling iron in the mouth, (or a plow clevis may be used, provided it will open the mouth wide enough to allow the hand to be inserted); have the head steadied, and insert your hand and take it out. An assistant to manipulate the obstruction on the outside, and push it up against you, will facilitate its removal wonderfully. If it cannot be reached, tap the paunch with the trochar and cannula, to evacuate the gas; (see cuts on pages 725 and 726); then pass down the probang, and with steady, gentle force push it through into the stomach. In the absence of a probang, a strong, three-quarter inch rope may be used. Dip it in hot water and oil it; then pass it down, twisting occasionally with the twist of the rope. Even, gentle pressure on the probang will make the obstruction yield in a few minutes.

II. Fractures.

As a rule, a broken bone is more easily repaired in the case of cattle than in horses, owing to their being more quiet. Fractures are classified

as transverse, oblique, "green-stick," simple, compound and complex. In transverse fracture, the bone is broken square off; in oblique, it is broken obliquely across; in "green-stick," it is bent and split but not broken clear off. In simple fractures, only the bone is broken without any complications; in compound, the ends of the broken bones punch through the flesh, and protrude; in complex, the bone is shattered into many small pieces.

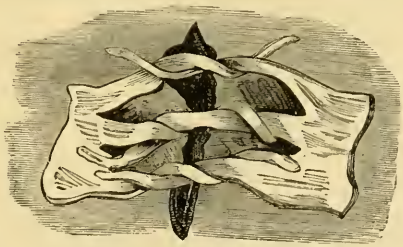
How to know it.—The only reliable tests, when there is displacement, is the unnatural position of the parts and the crepitation (grating of one bone upon another) that may be heard when the parts are moved.

TRANSVERSE AND OBLIQUE FRACTURES OF BONE.

What to do.—In case of a broken leg (by far the most common fracture in cattle), place the bones in position as nearly as possible, and put on a plaster of Paris bandage, to enclose the leg and maintain the parts in place. In the absence of plaster of Paris, sole leather, softened with water and fitted to the leg may be used; bind it on with a bandage. Keep the animal as quiet as possible. Compound and complex fractures are generally fatal, on account of the inflammation that follows.

III. Wounds.

Wounds on the body may be sewed up with any of the different sutures described in the Horse department, on page 460. Wounds on the



MANY-TAILED BANDAGE FOR LARGE LACERATED AND OPEN WOUNDS.

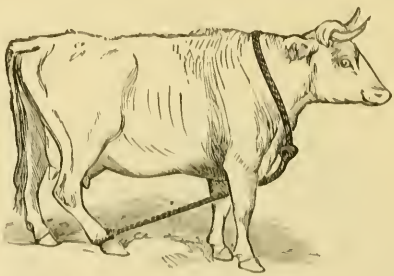
legs are best held together with bandages. The many-tailed bandage is particularly handy to draw the edges together and hold them in place.

Bandages should be kept scrupulously clean, by washing them once or twice a day and bathing them with recipe No. 9. When the wound is well filled up, apply No 1, with No. 2 occasionally

IV. Dislocations.

Cattle are peculiarly liable to dislocation of the patella. It slips off on the outside when the leg is back of a perpendicular position, and the animal is unable to bring it forward. This is well shown in the accompanying illustration. It is best reduced by pulling the foot forward with a rope passed around the pastern, and pushing inwards on the stifle bone (patella), when it will snap in, and locomotion can be resumed at once.

DISLOCATION OF THE PATELLA.



SIMPLE METHOD OF PREVENTING A RECURRENCE OF DISLOCATION OF THE PATELLA.

In the first few instances, the joint is injured, so that considerable swelling takes place and causes great lameness, but after a few dislocations it slips in and out easily.

What to do.—Fasten the leg forward with the rope passed around the neck as seen in the annexed cut. Foment the joint with hot water

several times a day, and when the inflammation is gone, blister thoroughly with the following blister:

No. 60. 1 Ounce powdered cantharides,
4 Ounces lard,
Mix.

Rub well in.

V. Sprains.

The best treatment for sprains is to foment them with hot water or hot vinegar three times a day, and apply the following liniment, rubbing it in thoroughly:

No. 61. 2 Ounces tincture arnica,
1 Ounce alcohol,
1 Ounce turpentine,
1 Ounce laudanum,
1 Ounce liquor ammonia,
Water to make one pint,
Mix.

If practicable, bandage tolerably tight. Give rest till the lameness is all gone.

VI. Wens.

These are hard, fibrous tumors resulting, usually, from a blow or other external violence. They are frequently seen on the ribs, legs and jaws of oxen.

What to do.—If noticed when first started, when they are sore, foment them with hot water several times a day; after a few days, the soreness being partially gone, paint them with tincture of iodine once a day. If, however, they become large and hard, nothing will be of any use short of dissecting them out. This may be done without any danger. Afterwards dress the wound with recipe No. 9, two or three times a day.

CHAPTER XIII.

OPERATIONS.

I. TAPPING THE CHEST, AND TAPPING THE BELLY.—II. TRACHEOTOMY.—III. TAPPING THE RUMEN (PAUNCH) FOR HOVEN.—IV. RUMENOTOMY.—V. CASTRATION.—VI. SPAYING.—VII. TAPPING THE BLADDER OF THE OX OR BULL.—VIII. SUTURES AND BANDAGES.—IX. CÆSARIAN OPERATION.—X. BLEEDING.

I. Tapping the Chest, and Tapping the Belly.

The first of these operations (*paracentesis thoracis*) has for its object the removal of water from the chest in hydrothorax. Clip off the hair from a spot about three inches back of the joint of the elbow, and on a level with it. Make an incision through the skin and muscles to a depth of about two inches, being careful to locate it so that it shall pass between two ribs, and not too close to the posterior aspect of the anterior one of the two—about midway if possible. Then pass in the trochar and cannula, withdraw the trochar, and leave the cannula to act as a spout for the water. If lymph or other substance clogs the hole,

MAKING THE INCISION WITH THE KNIFE

THE FLUID FLOWING FROM THE CHEST THROUGH THE CANNULA.

push it away with a whalebone probe. The other side may be tapped in the same way. The trochar for this operation should be about a quarter of an inch in diameter.

Paracentesis Abdomenis is the same operation, to empty the belly in peritonitis. Make the incision in the center line of the belly just back of the navel. Use the same trochar, but do not insert it deeper than two inches. In either of these operations, when the instrument is withdrawn the hole will close without any aid.

II. Tracheotomy.

This is the insertion of a tube in the windpipe, in case of threatened suffocation. It is identical with the same operation on the horse, described on page 461.

III. Tapping the Rumen (Paunch) for Hoven.

Insert the trochar, which may be a large one ($\frac{3}{8}$ of an inch in diameter), in the center of a triangle made by the last rib, the anterior point of the hip and the ends of the transverse processes of the lumbar spines on the left side. Point it downward and inward obliquely, and it will pass directly into the paunch, which grows to the left side only, and only in this vicinity. Pull out the trochar, and the gas will escape through the cannula. (See the article, with cuts, on Hoven.)

IV. Rumenotomy.

This is an operation to empty the paunch in case of engorgement, when a passage cannot be effected in the regular way. Clip off the hair from the triangle described in the last article, on the left side, (see cuts on pages 725 and 727), and make an opening, running up and down, large enough to insert the hand; open first the skin, next the muscles, then the wall of the paunch. Insert a towel, and arrange it to cover the lower edge of the wound, to keep the latter clean. Then empty the paunch with the hand. When nearly empty, pour in recipe No. 26, wash the wound, and sew it up with cat-gut sutures. First sew the paunch, leaving the ends hanging inside; then draw the muscles together, the ends of the ligatures hanging outside; then sew up the skin. Dress the whole with lotion No. 9, keeping the parts wet with it nearly all the time.

V. Castration.

This may be done to calves by laying them down on their backs, opening the scrotum and cutting through the tunics to the testicle, letting it out, when the tunics may be cut from their attachment at the end of the testicle, and the testicle pulled out, tearing away the spermatic cord. Pour a little cold water into the scrotum, and let the calf up. Old bulls may be castrated standing. Make a separate opening for each testicle, and let the testicle out of the tunics; cut off the cord with the ecraseur well up towards the body; if no ecraseur is procurable, apply clamps, which may be removed after two days.

VI. Spaying.

This is an operation on the female to remove the ovaries, and corresponds to castration of the male. In young, small heifers it is best done in the flank. Lay the heifer on her left side with the legs stretched back. Clip off the hair from the angle between the point of the hip and last rib; make an incision, running up and down, large enough to admit the hand; pass the hand into the abdominal cavity and find the womb; follow up a horn of the womb till the ovary is reached, pull the ovary out, and either cut or twist it off,—preferably the latter, to avoid bleeding. If cut off, the artery should be twisted, to arrest the hemorrhage. The parts are put back, and the other ovary is brought up and operated on similarly. This one may be more difficult to bring out, but gentle traction will accomplish it. Select warm pleasant weather for this operation, to avoid chilling the intestines. Great care should be taken to keep everything as clean as possible, as hair or other foreign particles, introduced into the belly, might cause fatal peritonitis. Stitch up the walls of the belly first; then the skin with cat-gut, interrupted sutures. Dress the wound with lotion No. 9.

Cows are best operated on standing. Make the incision through the upper wall of the vagina close to the *os uteri*, large enough to introduce two fingers, by which the ovaries are pulled out and excised with an ecraseur. A couple of stiches may be taken in the wound. Dress it afterwards with lotion No. 47, twice a day. Feed lightly for a day or two before the operation, and give bran mashes for a few days after. If peritonitis sets in, (which, however, it is not very likely to do), treat it according to the directions for that disease.

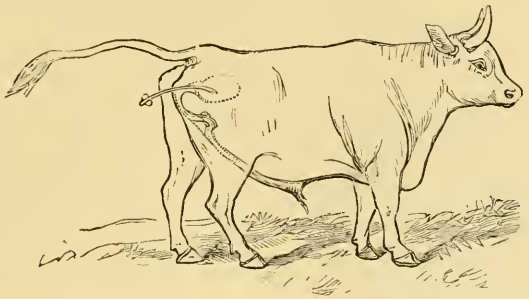
VII. Tapping the Bladder of the Ox or Bull.

When it is necessary to draw off the urine of the male, an opening must be made at the point where the penis turns over the angle of the pelvis, and the catheter introduced as seen in the annexed cut. The incision should be made very carefully, and no larger than really necessary to introduce the instrument. Dress the wound with No. 9, twice a day. It will be advisable to take a stitch in it, of course. The curve in the urethral canal (see cut on page 737) is what makes this operation necessary, as it renders the introduction of a catheter by the penis impossible.

VIII. Sutures and Bandages.

Sutures are used in sewing wounds, whenever they are longer than half an inch. The material generally used is silk, doubled once or twice, to make the cord large enough to prevent it from pulling out. Silver wire

may be used, but has no special advantages over the silk. Pass the needle through the skin about half an inch back from the edge and tie loosely, leaving the ends about half an inch long.



OPERATION FOR REMOVING URINE FROM THE OX.

Bandages are particularly useful in cases of wounds on the legs, since there the stitches will almost invariably pull out, unless thus reinforced. The many-tailed bandage shown on page 773 is very useful. For further details see the corresponding article in the Horse department.

IX. The Cæsarian Operation.

This is resorted to for the delivery of the calf, in the extremity mentioned on page 751. The belly is opened high up in the flank on the right side, and an incision made in the uterus, and the calf taken out. It is seldom resorted to, for obvious reasons.

X. Bleeding.

A cord is passed around the neck, and tied tight enough to raise the vein, over which a fleam is held and struck with the blood-stick. When sufficient blood has been taken, remove the cord and close the wound with a twisted ("figure 8") suture.

The article on Bleeding, in the Horse department, should be read in connection with the foregoing directions.

OX PREPARED FOR BLEEDING.

CHAPTER XIV.

RECIPES FOR CATTLE.

As a matter of convenience to the reader, to whom time will often be precious in treating his sick stock, we add this chapter, recapitulating all our prescriptions for cattle.

No. 1. HEALING LOTION.

Sugar of lead, 1 ounce,
Carbolic acid, 2 drachms,
Laudanum, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day.

No. 2. ANTISEPTIC LOTION.

Carbolic acid, 1 part,
Olive oil, 8 parts,
Mix.
Apply three times a day.

No. 3. ANTISEPTIC DRENCH.

Nitro-muriatic acid, 1 drachm,
Bi-chromate potash, 3 grains,
Chlorate potash, 2 drachms,
Water, ½ pint,
Mix.
Give as one dose two or three times a day.

No. 4. TONIC POWDER.

Copperas, ½ ounce,
Oil-cake, a handful,
Powder and mix.
Give as one dose, and repeat morning and night.

No. 5. POWDER FOR RHEUMATISM.

Colchicum, 2 drachms,
Nitrate of potash, 2 drachms,
Mix.
Give as one dose, and repeat night and morning for a week.

No. 6. LINIMENT FOR RHEUMATISM.

Laudanum, 1 ounce,
Spirits camphor, 1 ounce,
Turpentine, 1 ounce,
Water to make 1 pint,
Mix.
Apply three times a day with friction, and bandage.

No. 7. TONIC DRENCH.

Gentian root, 1 ounce,
Ginger, ½ ounce,
Oatmeal gruel, 1 quart,
Mix.
Give as one dose, and repeat three times a day for two weeks.

No. 8. MILD PURGATIVE.

Epsom salts, 12 ounces,
Ginger, 1 ounce,
Gentian, 1 ounce,
Syrup, 4 ounces,
Water to make 2 quarts,
Mix.
Give as one dose.

No. 9. CARBOLIC LOTION.

Carbolic acid, ½ ounce,
Water, 1 pint,
Mix.
Apply two or three times a day; in case of a surface sore, bind on a sponge wet with the lotion.

No. 10. ALTERATIVE AND STIMULATING DRENCH.

Iodide potash, 2 drachms,
Whiskey, 2 ounces,
Powdered cinchona, 1 ounce,
Gruel, 1 pint,
Mix.
Give as one dose, and repeat three times a day.

No. 11. TONIC POWDER.

Saccharized carbonate of iron, 2drs.
Powdered cinchona bark, 2 drs.,
Mix.
Give as one dose; repeat morning and night.

No. 12. TURPENTINE DRENCH.

Oil turpentine, 1 ounce,
Linseed oil, ½ pint,
Mix.
Give as one dose, repeat three times a day.

No. 13. TONIC DRENCH.

Tincture muriate of iron, ½ ounce,
Tincture cinchona, 1 ounce,
Water, 2 ounces,
Mix.
Give as one dose; repeat three times a day, between the doses of No. 12.

No. 14. AMMONIA LINIMENT.

Liquor of ammonia, 1 ounce,
Oil of turpentine, 1 ounce,
Linseed oil, 1 ounce,
Mix.
Rub well in to the face and head once a day.

No. 15. SILVER LOTION.

Nitrate of silver, 10 grains,
Water, 1 ounce,
Mix.
Apply twice a day with a camel's hair brush.

No. 16. A GARGLE.

Chlorate of potash, 1 ounce,
Water, 1 pint,
Mix.
Inject a little into the throat as a gargle several times a day.

No. 17. MIXTURE FOR DIARRHŒA.

Infusion of quassia, 1 pint,
Laudanum, 1 ounce,
Sulphuric ether, ½ ounce,
Cold, thin gruel, 1 pint,
Mix.
Give as one dose. Repeat, if necessary.

No. 18. FEVER MIXTURE.

Spirits nitre, 3 ounces,
Tincture aconite root, 2 drachms,
Fluid extract belladonna, ½ oz.,
Nitrate potash, 2 ounces,
Muriate of ammonia, 2 ounces,
Water to make 1 quart,
Mix.
Give half a teacupful every two or three hours till better.

No. 19. TONIC AND ALTERATIVE POWDER.

Nitrate of potash, 2 drachms,
Gentian root (powdered), 2 drs.,
Ginger, 1 drachm,
Mix.
Give as one dose; repeat morning and night for a week.

No. 20. STIMULATING DRENCH.

Infusion of gentian, ½ pint.
Ginger, 1 drachm,
Carbonate of ammonia, 1 drachm,
Syrup, 2 ounces,
Water, ½ pint,
Mix.
Give as one dose, and repeat three times a day.

No. 21. TONIC POWDER.

Sulphate of iron (copperas), 3 drs.,
Gentian, 2 drachms,
Ginger, 1 drachm,
Fœnugreek seed, 1 drachm,
Powder and mix.
Give as one dose, and repeat morning and night for a week or two.

No. 22. A GARGLE.
Chlorate of potash, 2 ounces,
Water, 1 quart,
Mix.
Shoot back into the throat, as a gargle, several times a day with a syringe.

No. 23. FEVER MIXTURE.
Mindererus' spirit (acetate of ammonia), 2 ounces,
Tincture aconite root, 20 drops,
Water, ½ pint,
Mix.
Give as one dose, and repeat every two hours till better.

No. 24. COUGH MIXTURE.
Gum camphor, 2 drachms,
Saltpetre, 4 drachms,
Spirits of nitre, 1 ounce,
Water (or gruel), 1 pint,
Mix as directed below.
Dissolve the camphor in the nitre, and add the water (or gruel) and saltpetre, and give as one dose. Repeat every four or six hours.

No. 25. HEALING LOTION.
Vinegar, 1 ounce,
Honey, 2 ounces,
Water, ½ pint,
Mix.
Apply three or four times a day.

No. 26. POWERFUL PURGATIVE.
Epsom salts, 1½ pounds,
Ginger, 2 ounces,
Gentian, 2 ounces,
Calomel, 2 drachms,
Croton oil, 20 drops,
Syrup, 1 pint,
Warm water, 2 quarts,
Mix.
Give as one dose.

No. 27. STIMULATING DRENCH.
Liquor ammonia, 1 ounce,
Warm ale, 1 quart,
Essence of ginger, ½ ounce,
Mix.
Give as one dose.

No. 28. ANTACID POWDER.
Bi-carbonate of soda, 3 drachms,
Gentian, 2 drachms,
Ginger, 2 drachms,
Mix.
Give as one dose, and repeat morning and night.

No. 29. ASTRINGENT DRENCH.
Prepared chalk, 1 ounce,
Powdered catechu, ½ ounce,
Powdered ginger, 2 drachms,
Powdered opium, ½ drachm,
Peppermint water, ½ pint,
Mix.
Give from two to four tablespoonfuls, according to the size of the calf, morning and night.

No. 30. ASTRINGENT DRENCH.
Tincture of catechu, 2 ounces,
Tincture of cardamoms, 2 ounces,
Carbonate of soda, 2 drachms,
Mix.
Divide into two to four doses, according to age of animal, and give one of them morning and night.

No. 31. ASTRINGENT DRENCH.
Powdered opium, ½ drachm,
Tincture of cardamoms, 1 ounce,
Sulphuric ether, 3 drachms,
Linseed tea (or starch gruel) 1 pint,
Mix.
Divide into six doses; give one night and morning.

No. 32. ALTERATIVE DRENCH.
Tincture of rhubarb, 1 ounces,
Powdered ginger, 2 drachms,
Warm gruel, 4 ounces,
Mix.
Give as one dose, and follow it with some doses of No. 30 or 31.

No. 33. ASTRINGENT DRENCH.
Prepared chalk, 1½ ounces,
Powdered catechu, 2 drachms,
Powdered opium, ½ drachm,
Powdered gentian, 2 drachms,
Starch gruel, 1 pint,
Mix.
Give as one dose; repeat in twenty-four hours, if necessary.

No. 34. ASTRINGENT DRENCH.

Powdered opium, 2 drachms.
Powdered starch, 4 ounces.
Sulphuric ether, 1 ounce.
Cold ale, 1 pint.
Mix.
Give as one dose. By substituting tepid water for the ale, it may be advantageously used as an injection.

No. 35. ASTRINGENT DRENCH.

Tannic acid, ½ drachm.
Powdered opium, 1 drachm.
Powdered gentian, 1 ounce.
Warm ale, 1 pint,
Mix.
Give as one dose.

No. 36. ALTERATIVE DRENCH.

Calomel, 1 drachm.
Powdered opium, 2 drachms.
Gruel, 1 quart.
Mix.
Give as one dose.

No. 37. ALTERATIVE DRENCH.

Epsom salts, 7 ounces.
Powdered opium, 2 drachms.
Powdered gentian, 2 drachms.
Gruel, 1 pint.
Mix.
Give as one dose.

No. 38. ANTISEPTIC MIXTURE.

Chloride of lime, ½ ounce.
Tincture of arnica, ½ ounce.
Sulphuric ether, 1 ounce.
Starch gruel, 2 quarts.
Mix.
Give half by the mouth and half by injection.

No. 39. STRONG INJECTION.

Linseed oil, 1 pint.
Oil turpentine, 1 ounces.
Croton oil, 30 drops.
Warm water, 1 quart,
Soft soap, 1 ounce,
Mix.
Repeat three times a day as an injection, till a full purgative action is got.

No. 40. STIMULATING SUBCUTANEOUS INJECTION.

Strychnine, 4 grains.
Spirits of wine, 1 ounce.
Sulphuric acid, 6 drops.
Mix.
When dissolved, inject from ten to twenty drops under the skin.

No. 41. ANODYNE FEVER MIXTURE.

Camphor, 2 drachms.
Sulphuric ether, ½ ounce.
Acetate of ammonia, 4 ounces, (as directed below).
Mix.
Dissolve the camphor in the sulphuric ether, and then add the acetate of ammonia. Give as one dose in ale or gruel.

No. 42. FEVER MIXTURE.

Mindererus' spirit, 3 ounces.
Tincture aconite root, 20 drops.
Linseed tea, 1 pint.
Mix.
Give as one dose, and repeat every two hours till better.

No. 43. STIMULATING DRENCH.

Sulphuric acid, 2 drachms.
Tincture of cardamoms, 1 ounce.
Water, 1 pint.
Mix.
Give as one dose.

No. 44. ANTILITHIC INJECTION.

Hydrochloric acid, 1 drachm.
Water, ½ pint.
Mix.
Inject into the bladder.

No. 45. ACID DRENCH.

Hydrochloric acid, 20 drops.
Gentian, 3 drachms.
Oat meal gruel, 1 pint.
Mix.
Give as one dose, and repeat it morning and night for a few days.

No. 46. ANTACID POWDER.

Bi-carbonate soda, ½ pound,
Gentian, 4 ounces,
Linseed meal, 2 pounds,
Mix.
Give two tablespoonfuls morning and night for two or three weeks.

No. 47. ANTISEPTIC INJECTION.

Carbolic acid, ½ ounce,
Water, ½ gallon,
Mix.
Use as injection twice a day.

No. 48. ANODYNE DRENCH.

Chloral hydrate, 1 ounce,
Water, 1 pint,
Mix.
Give as one dose; repeat, if necessary, in half an hour.

No. 49. HEALING LOTION.

Spirits of camphor, 4 ounces,
Sugar of lead, 1 ounce,
Sulphate of zinc, 2 drachms,
Soft water, 1 quart,
Mix.
Bathe the parts once a day.

No. 50. SOFTENING LOTION.

Gum camphor, 4 ounces,
Olive oil, 1 pint,
Mix.
Rub well in three times a day.

No. 51. ANTISEPTIC POWDER.

Sulphite soda, 1 ounce,
Nitrate potash, 2 drachms,
Mix.
Give as one dose in a bran mash; repeat morning and night for a week.

No. 52. ASTRINGENT OINTMENT.

Alum, 1 ounce,
Carbolic acid, 1 drachm,
Lard, 4 ounces,
Powder the alum and mix.
Apply twice a day.

No. 53. ASTRINGENT OINTMENT.

Tannic acid, ½ ounce,
Carbolic acid, 1 drachm,
Lard, 4 ounces,
Mix.
Apply twice a day.

No. 54. NERVINE AND ALTERATIVE.

Nux vomica, 2 drachms,
Saltpetre, ½ ounce,
Mix.
Give as one dose, repeating it morning and night for a month.

No. 55. LOTION FOR LICE.

Tobacco, ½ Pound,
Water, 1 gallon,
Steep for two hours.
Apply warm.

No. 56. MIXTURE FOR RINGWORM.

Tincture of iodine, 2 ounces,
Oil of tar, 1 ounce,
Glycerine, 2 ounces,
Mix.
Rub well in once a day.

No. 57. MIXTURE FOR RINGWORM.

Solution iodo-bromide of calcium compound, 1 ounce,
Water, 3 ounces,
Mix.
Rub well in once a day.

No. 58. EYE WASH.

Sulphate of atropia, 2 grains,
Water, 1 ounce,
Mix.
Apply several times a day with a camel's hair brush.

No. 59. EYE WASH.

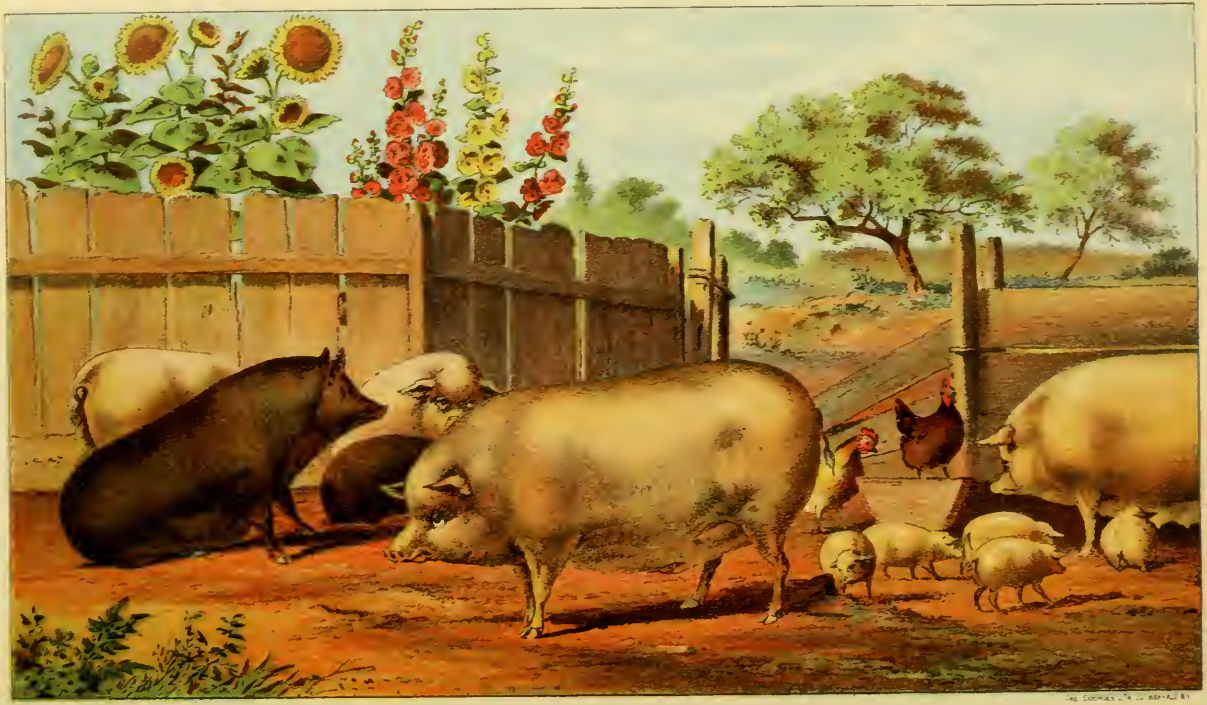
Nitrate of silver, 10 grains,
Water, 1 ounce,
Mix.
Apply directly to the eyeball, morning and night, with a camel's hair brush.

No. 60. FLY BLISTER.

Powdered cantharides, 1 ounce,
Lard, 4 ounces,
Mix.
Rub well in.

No. 61. LINIMENT FOR SPRAINS.

Tincture arnica, 2 ounces,
Alcohol, 1 ounce,
Turpentine, 1 ounce,
Laudanum, 1 ounce,
Liquor ammonia, 1 ounce,
Water to make one pint,
Mix.
If practicable, bandage tolerably tight. Give rest till the lameness is all gone.



SWINE.

PART V.

SWINE.

HISTORY, MANAGEMENT AND CHARACTERISTICS OF THE VARIOUS BREEDS.

SWINE.

CHAPTER I.

HISTORY AND STATISTICS OF SWINE.

I. ORIGIN AND ANTIQUITY OF THE HOG.——II. THE NATIVE AMERICAN SPECIES.——III. SWINE OF EUROPE, ASIA AND AFRICA.——IV. THE WILD HOGS OF EUROPE.——V. TEETH OF THE HOG.——VI. BROUGHT TO AMERICA BY COLUMBUS.——VII. THREE GREAT SWINE PRODUCING STATES.——VIII. IMPORTANCE OF THE PORK INTEREST.

I. Origin and Antiquity of the Hog.

The original country of the hog, like that of the other domesticated animals of the farm, is lost in the obscurity of the past. Yet, ever since history began, the hog has been known in a wild state in Asia, Africa and in Europe. That the hogs of all these countries have a common origin is shown by the fact that they all belong to the same scientific classification, *sus scrofa*, and also by the more important fact that they are all fertile together, and continue to produce fertile offspring, from generation to generation.

The great antiquity of swine is shown by the fact that fossil remains have been found in the tertiary and diluvial deposits of Europe; and fossils of a species closely allied to them have been found in as ancient deposits in India. Whatever their origin may have been, their aptitude for taking care of themselves in a wild state—for they are both flesh and vegetable feeders—and their great fecundity would soon have enabled them to overrun large territories.

II. The Native American Species.

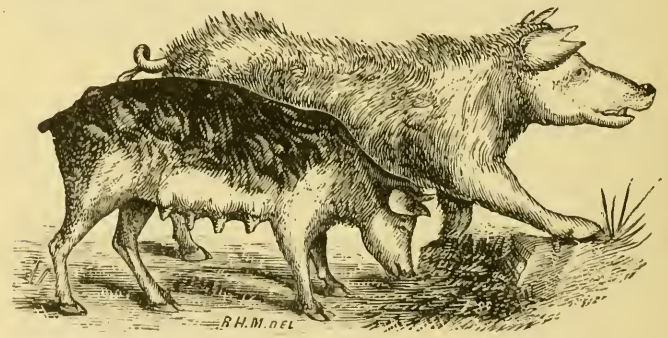
While the original of the domesticated hog was only found in Asia, Africa and Europe, yet allied native species are found in America. In Australia, the Polynesian groups, and the other Pacific islands, swine were unknown until introduced there by civilized people. The same is true of America. The allied species here are not, we believe, continuously fertile with the domesticated hog.

III. Swine of Europe, Asia and Africa.

While it is a fact, as previously stated, that the swine of Europe, Asia and Africa have a common origin, there is no means of knowing how or when they were first introduced. The probability, however, is that they spread spontaneously over these countries; for the original forest covering rendered the means of migration easy to them, since thick timber and all the lands along streams furnish their natural feeding grounds.

IV. The Wild Hogs of Europe.

It matters little, practically, how any of the farm animals originated, or how they were naturally disseminated over the earth; though to savants, of course, the question is curious and interesting. It is worthy of remark, that of all domestic animals used as food by man, the hog is the only one that has preserved his native characteristics unmodified in a wild state.



HOGS RUN WILD IN THE WEST AND SOUTHWEST.

The hunting of wild hogs has formed an exciting chase in all ages of the world, both on account of their fleetness and their savage courage when brought to bay. In the southern portions of the United States, in sparsely settled districts, swine are found escaped from domestication, and showing all their natural savage traits, including dangerous fierceness when brought to bay. Forty years ago the writer hunted wild hogs,—the descendants of Indian breeds,—in the swamps and morasses of northern Indiana and the timbered river bottoms of the Calumet. The hard winter of 1844, however, destroyed the last remnant of these wild hogs, they having all died in their lairs, from exposure and want of food. Wild hogs are now rarely found in Europe, and this when preserved in royal forests as in Denmark, Italy and Greece. In France and Germany they have become extremely rare, and in Great Britain the wild species has long been extinct.

V. Teeth of the Hog.

The teeth of swine are 44 in number, as follows: Incisors, six upper and six lower, (12); canines or tusks, two upper and two lower, (4); molars, or grinding teeth, fourteen upper and fourteen lower, (28); making 44, including what were formerly called wolf teeth, but are now classed with the molars. They are represented scientifically by the dental formula: $\frac{6}{6} - \frac{2}{2} - \frac{14}{14} - 44$. Furstenburg, a careful German authority, gives the manner of determining the age of swine as follows:

Born with eight teeth, four corner incisors and four tusks, on the eighth or tenth day the second or third temporary molars appear. The four nippers, two on the upper and two on the under jaw, appear at four weeks old.

At the fifth or sixth week the first temporary molars appear in the upper and lower jaw.

At the age of three months the intermediary incisors appear.

At the sixth, the so-called wolf teeth are seen, and also the third permanent molars.

At the ninth month the permanent corner incisors, the permanent tusks, and the second permanent molars will be seen.

At twelve months the permanent nippers will have appeared, and by the thirteenth month, the three temporary molars will have been shed, and the permanent ones will be seen; at fifteen months these will be fully up.

At the age of eighteen months the permanent intermediary incisors and the permanent rear molars will show, and at the twenty-first month these will be fully developed, thus completely finishing the permanent dentition.

From this time on, the means for determining the age is by the wear of the permanent teeth, and also by the increasing length of the tushes, which at from four to ten years, attain such size and become such formidable weapons that it is said that hogs have been known to cope successfully with the lion. Certain it is that no beast dares attack them when herded together, and it is only by the strategy of man that they may be successfully hunted and killed. And so dangerous has this pastime always been considered, that a boar's head has been counted as one of the most valuable trophies of the chase.

VI. Brought to America by Columbus.

The history of the introduction of swine into America is that they were brought by Columbus to Hispaniola in 1493, and to Florida in 1538 by De Soto; they were brought to Nova Scotia and Newfoundland in 1553 by the French, and into Canada in 1608. In 1609 they were brought

into Virginia by the English adventurers, and eighteen years thereafter it is recorded that their numbers had so increased that the settlement at Jamestown had to be surrounded with palisades to keep them away.

VII. Three Great Swine Producing States.

From 1871 to 1878 the swine of the United States increased from 29,457,500 to 32,362,500 head. In the latter year the three greatest hog producing States were Illinois, 3,355,500; Ohio, 2,341,411, and Iowa 2,244,800 head. In that year there were packed in Chicago alone, over 4,000,000 head, in 1879 nearly 5,000,000, and in 1880, over 4,500,000 head.

VIII. Importance of the Pork Interest.

In the whole Mississippi Valley there were packed in 1877-8, 6,502,446 head of hogs. In 1878-9, 7,475,648 head, and in 1879-80, 6,946,151 head. The average net weight of these hogs, was for 1878, over 226 pounds, for 1879, over 217 pounds, and for 1880, nearly 213 pounds.

The total export of hog products for 1876 to 1880 inclusive was as follows:

	From New York.			From Boston, Philadelphia, Baltimore, Portland, New Orleans and Montreal.		
	Pork barrels	Bacon and Hams, pounds	Lard, pounds.	Pork barrels.	Bacon and Hams, pounds.	Lard, pounds.
1876	198,981	220,338,187	153,010,890	70,642	195,849,415	57,402,146
1877	203,506	236,909,669	176,546,193	67,536	188,691,271	54,275,154
1878	284,619	427,730,887	247,325,212	69,016	206,734,658	80,877,847
1879	304,880	503,867,149	243,281,844	55,206	236,460,063	84,819,335
1880	282,261	511,317,129	293,745,050	58,969	288,069,645	97,284,391

CHAPTER II.

BREEDS OF SWINE.

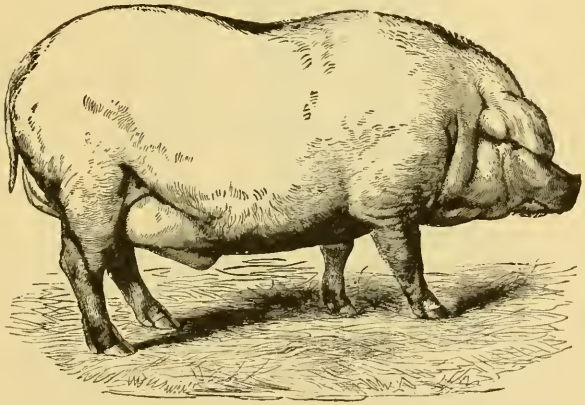
I. SIRES OF IMPROVED BREEDS.——II. CHINESE SWINE.——III. NEAPOLITAN SWINE.——IV. THE HOG OF INDIA.——V. ENGLISH BREEDS—THE BERKSHIRE.——VI. THE ESSEX.——VII. THE BLACK DORSET.——VIII. THE SUFFOLK.——IX. THE YORKSHIRE.——X. LANCASHIRE BREEDS.——XI. AMERICAN BREEDS.——XII. THE CHESTER WHITE.——XIII. THE POLAND-CHINA.——XIV. THE CHESHIRES.——XV. JERSEY RED SWINE.——XVI. DUROC SWINE.——XVII. SUMMARY OF BREEDS.

I. Sires of Improved Breeds.

The swine used in the improvement of the breeds of England and the United States, are: First, the China hog; second, the Neapolitan hog, and third the hog of India. The first has given remarkable aptitude in fattening, while the second and third have imparted style, beauty of form and excellence of flesh.

II. Chinese Swine.

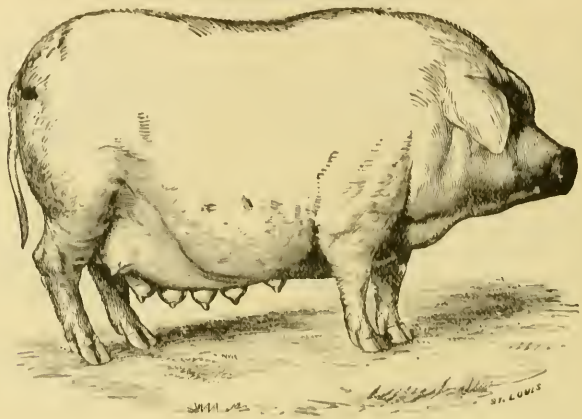
The first improvement in modern swine is undoubtedly due to importations of hogs from China. They are remarkable for prepotency of



CHINESE BOAR.

blood, due to their careful breeding for centuries in China with special reference to early maturity and aptitude for fattening; and these hogs were the basis upon which all English and American breeds were originally

built. The infusion of this Chinese blood long since converted the original raw-boned, hard-feeding, long-nosed and long-legged hogs of England of 100 years ago, into compact, deep-bodied, broad-backed, short-nosed and early maturing hogs of fifty years ago, known in the earlier crosses



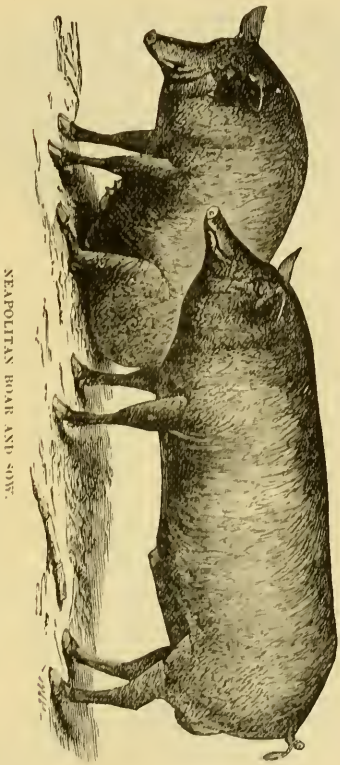
CHINESE SOW.

as Grass-breed, Irish Graziers, etc. Then came in the India hog, reducing the bone, hair, and coarseness of flesh still more; and afterwards the improved form of the India hog—the Neapolitan—still further refined them, giving us the splendid Berkshire, the Essex, and various other black and spotted breeds.

III. Neapolitan Swine.

Neapolitan swine are marked for the excellence of their flesh, their elegant style, little hair and fine bone. In relation to them Sidney says it is probable that the Neapolitans are the descendants of the dark Eastern swine imported by early Italian voyagers and cultivated to perfection by the favorable climate and welcome food. Martin is of the opinion that to this breed and to the Chinese is due the improvement of all English swine, and, in this connection mentions particularly the Berkshire, Essex, Hampshire and Yorkshire. Youatt, while accepting the authority of Martin, adds also the swine of Wiltshire. Of these breeds only the Berkshire, Essex and Yorkshire have held their ground with the other improved breeds of to-day, and these are among the finest and most generally liked of any of the now fashionable breeds. The first importation

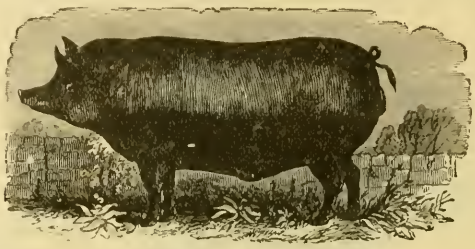
of Neapolitan swine into the United States, is said to have been made about 1840; but in 1850 fine specimens were imported into New York by a Mr. Chamberlain. They are described as having been of a dark slate color, and as having brought their pigs true to color and characteristics.



NEAPOLITAN BOAR AND SOW.

The Neapolitans are well described by a committee of the American Swine Breeders Association as follows: Head small; forehead bony and flat; face slightly dishing; snout rather long and very slender; ears small, thin, standing forward nearly horizontally, and quite lively; jowls very full; neck short, broad and heavy above; trunk long, cylindrical and well ribbed back; back flat, and ribs arching, even in low flesh;

belly horizontal on the lower line; hind-quarters higher than the fore, but not very much so; legs very fine, the bones and joints being smaller than those of any other breed; hams and shoulders well developed and



NEAPOLITAN AND ESSEX CROSS.

meaty; tail fine, curled, flat at the extremity, and fringed with hair on each side; general color slaty, or bluish plum color, with a cast of coppery red; skin soft and fine, nearly free from hair, which, when found upon the sides of the head and behind the forelegs, is black and soft, and rather long; flesh firm and elastic to the touch.

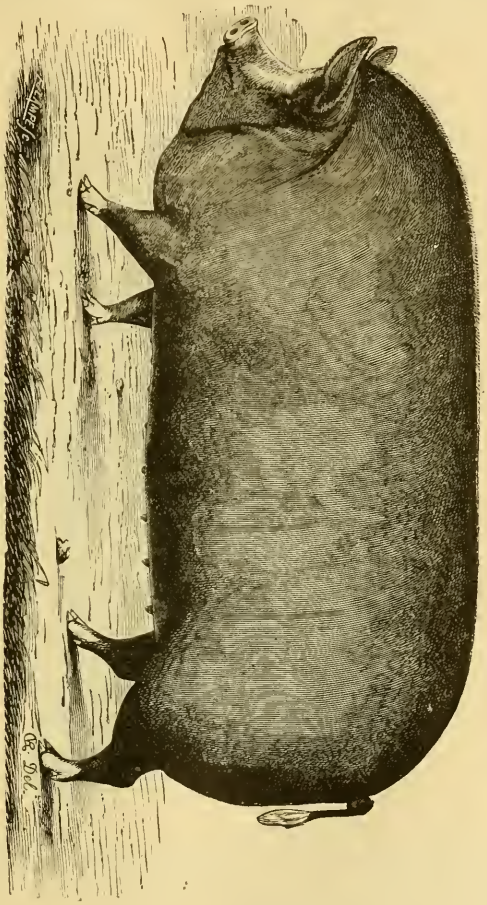
IV. The Hog of India.

These swine hold the same relation to the Neapolitan that the Chinese do to the improved breeds of white swine. They are undoubtedly ancestors of the Neapolitan breed. The hog of India, of which the Siamese hog may be said to have been a representative, was in color from a jet black to a dark slate, or rich plum color, of medium size, quick to mature; very fine in all points, with short, small legs and head; thin jowls, a dished face, slender, erect ears; broad, deep, compact body, well ribbed, heavy hams and shoulders; slender tail, skin thin, but firm and elastic to the touch.

V. English Breeds—The Berkshire.

The Berkshire is among swine what the thoroughbred is among horses—a type of perfect breeding. The Berkshires are noted for their fine bone, great muscularity, firm flesh, and excellent hams and shoulders. Their constitutions are most excellent, and they are among the best of the improved breeds as gleaners after fattening cattle. They require somewhat more feed in proportion to their weight than some of the breeds abounding in lard and other fat; but this is compensated for in the greater proportion of lean meat and its excellent distribution.

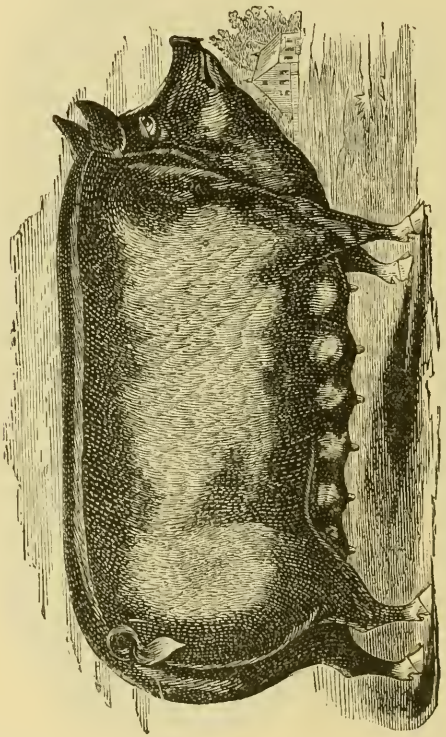
The fashionable color now is, black all over except the dish of the face, the feet and the end of the tail, which are white. If there is white, no



BERKSHIRE SOW.

matter how small, on the body, discard such animals; a bluish spot or tinge is not objectionable, but rather shows a strengthening of the blood by reversion to the original cross. The points of the pure Berkshire

are: Face short, fine and well dished; generally broad between the eyes; ears almost erect, sometimes inclined forward with advancing age, always small, thin, soft and showing veins; jowl full; neck short and thick; shoulder short from neck, but moderately deep from back down; back broad and straight, or very little arched; ribs long and well sprung,

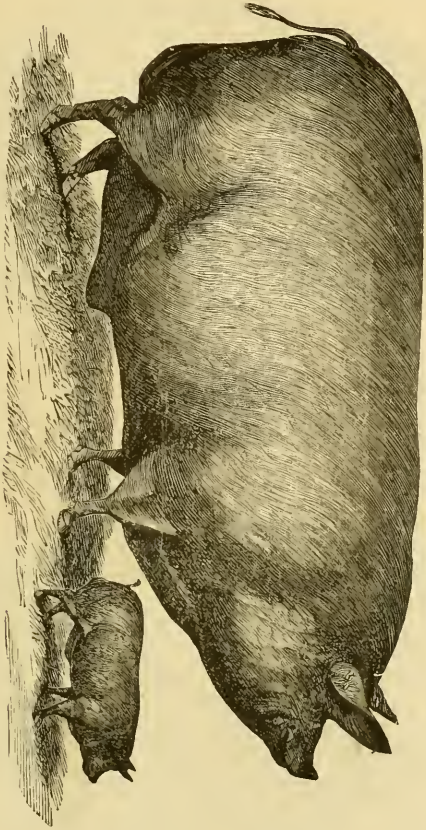


BERKSHIRE SOW, BREEDER.

giving rotundity of body; short ribs of good length giving breadth and levelness of loin; hips good length from joint of hips to rump; hams thick, round and deep, holding their thickness well back and down to the hocks; tail fine and small, set on high up; legs short and fine, but straight and very strong, with hoofs erect and legs set wide apart; size medium; length medium, since extremes are to be avoided; bone fine and compact; offal very light; hair fine and soft; no bristles; skin pliable.

VI. The Essex.

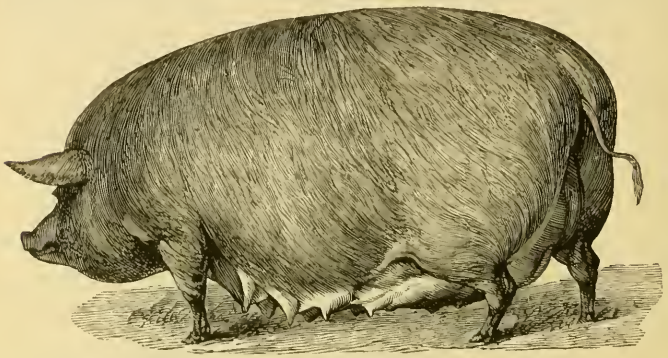
This medium to light weight English breed is, to our mind, one of the very best of the breeds ever introduced into the United States. They



ESSEX BOAR AND PIG.

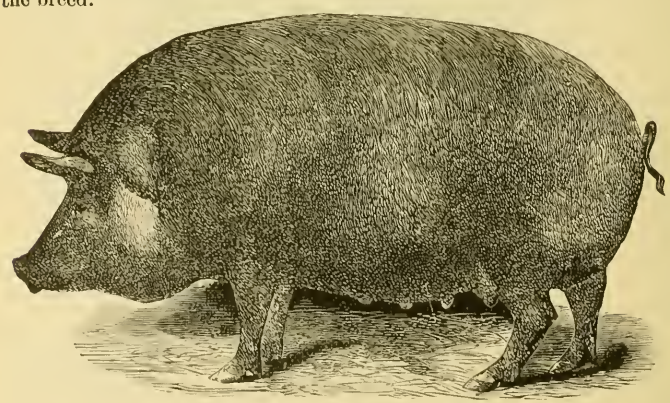
combine great stamina and vigor of constitution. They make excellent pork, not too fat. The sows are prolific and are good nurses; and the barrows fatten easily and kindly at any age. When mature they weigh about 300 pounds. They make excellent crosses on coarse swine, the produce being fine-boned, quiet, and easily fattened hogs. The Essex, in

shape and color, is not unlike the Berkshire, but larger proportionally. The color is a pure, deep black; face short and dished; ears small, soft and erect while young, but falling over somewhat with age; the bone is



ESSEX SOW.

fine, hair thin; the carcass long, broad, straight and deep, with excellent hams, carrying meat fully down near the hock. Their great delicacy of form is due to their crossing with the Neapolitan; and except that they are better haired the cuts we give would not be bad representations of the breed.



BLACK DORSET SOW.

VII. The Black Dorset.

The black swine of Dorsetshire, England, are a breed in high repute, locally. They are represented as being strong-constitutioned, attaining

heavy weights and fattening kindly. If the illustration, reproduced from an English cut, showing the hog in breeding flesh is a good representation of the breed, they ought to be valuable in the West. The great trouble with our breeders is that they are working their stock too fine. Many of them have not head and jaw enough to perfectly grind corn. They have too little hair, and their constitutions have suffered from too close breeding, rendering them liable to disease. We believe the coming hog will be the reverse of this.

VIII. The Suffolks.

The Suffolk is now regarded as only a variety of the Yorkshire, one of the best of the English white breeds. The Manchesters, the Middlesex, the Suffolk, the so-called Windsor, the Calehill and the Cheshire of New York State have all been formed on the Yorkshire-Cumberland stock, and the differences in all these breeds are trifling.

The characteristics of the Suffolks are given in the Swine Register as follows: Head small, very short; cheeks prominent and full; face dished; snout small and very short; jowl fine; ears small, thin, upright, soft and silky; neck very short and thick, the head appearing almost as if set on front of shoulders; no arching of crest; crest wide and deep; elbows standing out; brisket wide, but not deep; shoulders and crop-shoulders thick, rather upright, rounding outward from top to elbows; crops wide and full. Sides and flanks—ribs well arched out from back, good length between shoulder and ham; flank well filled out and coming well down at ham. Back broad, level and straight from crest to tail, not falling off or down at tail; hams wide and full, well rounded out: twist very wide and full all the way down. Legs and feet—legs small and very short, standing wide apart, in sows just keeping the belly from the ground; bone fine; feet small, hoofs rather spreading; tail small, long and tapering. Skin, hair, and color—skin thin, of a pinkish shade, free from color; hair fine and silky, not too thick; color of hair pale yellowish white, perfectly free from any spots or other color. Size small to medium.

The principal objections to the Suffolk are: They have too much fat; they are bad nurses: the pigs are weak; and they are subject to scrofula.

IX. The Yorkshire.

The Yorkshire is, to our mind, one of the very best of the English white breeds. They are hardy, vigorous, and well-haired; they are prolific and good nurses; they are uniform in shape and color, and of any size requisite, from 200 pound hogs up to heavy weights, according as you select the small, the middle, or the large breed. The middle breed is

produced between the small York and the Cumberland. The large Yorkshire attains heavy weights, while the middle breed is about the size and weight of the Berkshire.

X. Lancashire Breeds.

This remarkable English breed is divided into three sub-families: The short-faced, the middle breed and the large Lancashire; the character-

SHORT-FACED LANCASHIRE HOGS.

istics and color (pure white) of each being constant. Over one hundred years ago the large breed were cultivated in England, and are represented as being of immense size, large-limbed and coarse-boned.

Short Faced Lancashire.—This breed is remarkable for the shortness of the face from the eyes to the end of the snout; prick ears; small bones; a good coat of white hair; cubic in form, with broad back and

broad hams, well let down. The skin, as well as the hair, is white, although an occasional one may be found having a few dark-blue spots on the skin, but never dark or black hairs.

Lancashire Middle-Breed.—This breed is one which partakes of the quality of the small breed and the size of the large breed. Middle bred hogs are got by crossing large bred sows with small bred boars, but all attempts to attain the same results by reversing this operation, and putting large bred boars to small bred sows have proved failures. The largest of the middle bred sows are used to improve the large breed. Their characteristics are: The small bred hog must have small bones; a short face; silky hair; fine, small, upright ears; a comparatively square form; must have good square hams, the most valuable part of the hog; must carry the meat near the ground; flat on the back; straight and cubic in form.

Lancashire Large Breed.—These hogs have large bones, are of great height and length, and are the largest breed of swine known. They are a true breed, and breed constant to color and characteristics. These are: Large size, great length; flat back, with large square hams when fattened; must carry their width of back along over the hams; must have deep and tolerably straight sides, large feet and leg bones; hair short; may have a long face, but it had better be short, as they fatten better; may have a large, drooping ear, but, other qualities and size being equal, an upright, smaller ear preferred. They usually have a long, thick, strong tail; must be of great weight when fattened, and above all must be descended from a hog having the foregoing qualities, and, if a breeder, must produce them. They are short of hair, but still are hearty. A middle bred hog must have a short face, and all other good qualities of the small breed, except that they may be longer in proportion to their width; must have thicker legs and longer bones to carry the greater size; should be well haired.

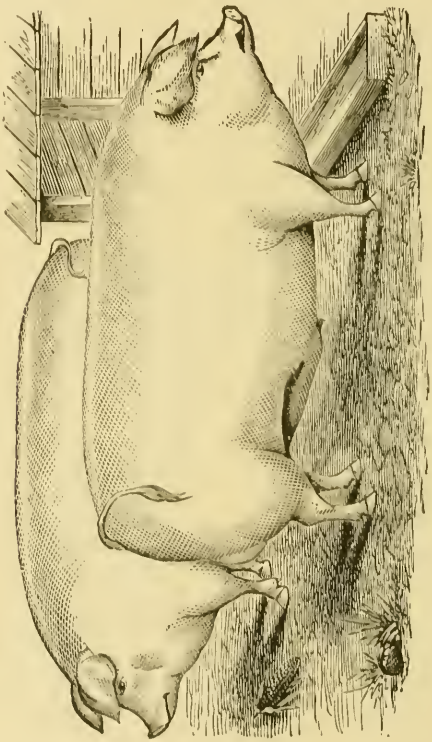
XI. American Breeds.

The American breeds in best repute are: The Chester White, which originated in Pennsylvania; the Poland-China, which originated in Ohio; Jersey Reds, originated in New Jersey; the Duroc, originated in New York; and Cheshire, originated in New York. These, however, as previously stated, are only modified Yorkshires. Of those breeds the Chester-White and Poland-China have been most widely disseminated.

XII. The Chester White.

This breed originated in Chester County, Pa., and is recorded to have been brought about as follows: The first impulse to the improvement of swine in that county was given by the introduction of a pair of fine pigs, brought from Bedfordshire, England, by Capt. James Jeffries, and

placed upon his farm near the county seat, in 1818. Some of the enterprising farmers of the neighborhood were encouraged to commence the improvement of their swine; and by crossing these pigs upon the native white hog of the county, their progeny with the best specimens attainable, and by a course of careful and judicious crossing and selection for many



CHESTER WHITE HOGS.

years, the present valuable breed of well formed, good sized, easily fattened hogs, known as Chester Whites, was produced and made an established breed.

The following are the characteristics of these hogs: Head, short and broad between the eyes; ears thin, projecting forward and lopping at the point; neck short and thick; jowl large; body lengthy and deep; back

broad; hams full and deep; legs short, and well set under the body for bearing the weight; coat thin, white, and straight; (if a little wavy it is no objection); small tail and no bristles.

XIII. The Poland China.

There has been much controversy over the origin and improvement of this breed of swine, and in some instances much acrimony. They have nevertheless held their own among the reputable breeds of the West, have been largely improved within the last fifteen years by infusion of Berkshire blood, and are now probably more widely disseminated west of the Alleghanies than any other breed except the Berkshires. The American Swine Breeders' Association give their history and characteristics as follows:

In 1816, the Shakers of Union Village, Warren county, O., purchased at Philadelphia one boar and three sows, of what was, at the time, believed to be pure China. They were called Big China hogs. Subsequently other China hogs were introduced and extensively used. The Shakers and other judicious breeders in Warren and Butler counties continued to cross them with the Russian and Byfield blood, that had long been in use there, and produced, by repeated crosses, a hog of exceedingly fine qualities for that period, which was generally known as the Warren county hog.

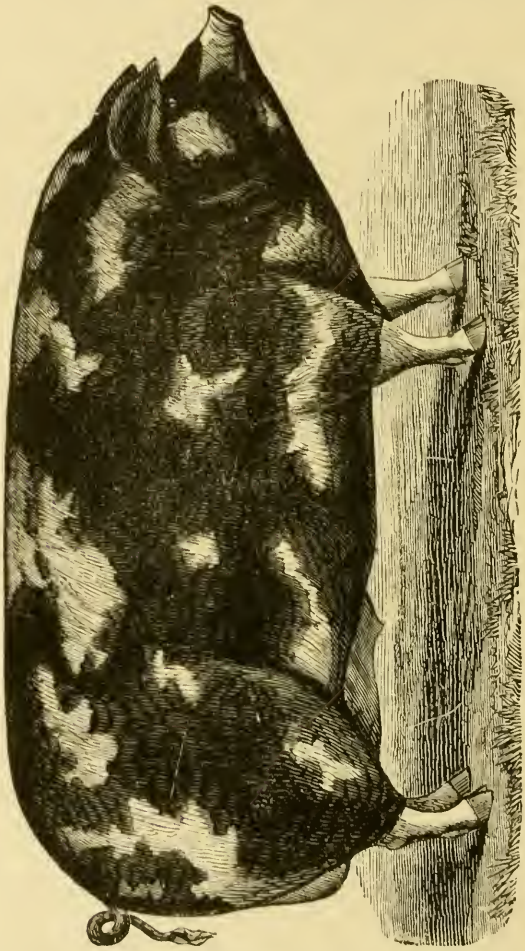
This condition of the breed continued until about the year 1835 or 1836, when the Berkshires were introduced. Other lots of Berkshires continued to come into the Miami Valley until about 1841. The Berkshire blood was liberally infused into the stock existing not only in Southwestern Ohio, but in Kentucky also.

Crossing with the Berkshires was almost exclusively done until about 1838 or 1839, when Mr. William Neff, of Cincinnati, imported some choice specimens of the Irish Grazier. This breed soon grew into high favor, and, as a consequence, was liberally used in making crosses with the best specimens of the crosses previously made. This crossing of breeds continued for some time. In a few years, however, the use of the pure blooded Berkshire was entirely discontinued, and there were no further importations made of the Irish Grazier.

For more than thirty years no new blood has been introduced into this breed, and no effort made to obtain a new supply of the blood of either breed previously used. While this is true, the breeders have not been indifferent to the further improvement of the breed.

The best specimens have good length; short legs; broad, straight backs; deep sides, flanking well down on the leg; very broad, full, square hams and shoulders; drooping ears; short heads, wide between the eyes, of

spotted or dark color; are hardy, vigorous, and prolific, and when fat are models, combining the excellences of both large and small breeds.



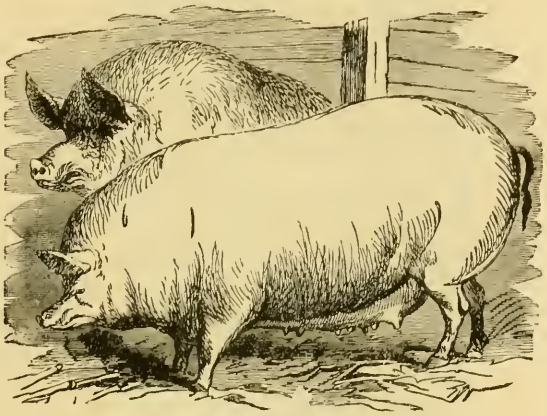
POLAND-CHINA BOAR.

It should be added, that the representation we give is that of a Poland-China, combining the characteristics of both the white and black crosses. The more fashionable color now is pure black, with minute white spots

scattered more or less over the body; this is undoubtedly owing to later and liberal infusions of modern Berkshire blood.

XIV. The Cheshire.

This variety, undoubtedly only a modified Yorkshire, is said to have originated in Jefferson county, N. Y. They are pure white in color, with little hair and a pink skin, thin and pliable, but not quite uniform, marked distinctions sometimes being noticed; and, like the Suffolks, the tails of the young pigs often drop off. The snout is often long, but very slender and fine. The jowls are plump, and the ear erect, fine, and thin. The



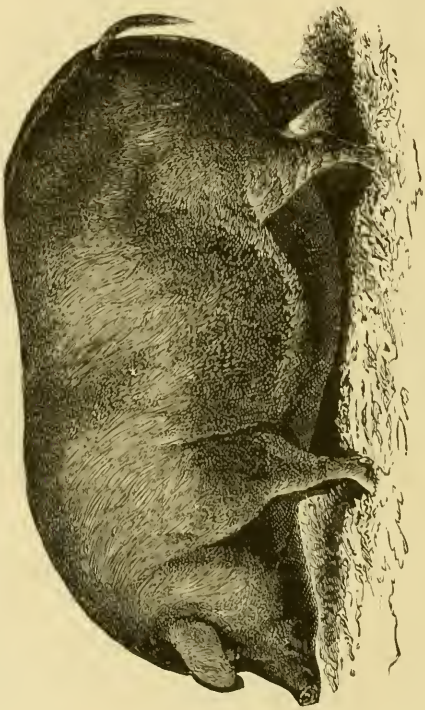
IMPROVED CHESHIRE.

shoulders are wide and the hams full. The flesh of these hogs is fine-grained, and they are commended on account of the extra amount of mess-pork in proportion to the amount of offal. The probability is they will never be very popular among the breeders in the West and South. Yet, for fattening exclusively in the pen, there are few of the white breeds that excel them.

XV. Jersey Red Swine.

The origin of this breed is not positively known. In some portions of New Jersey they have been bred for over fifty years, and are there considered valuable. Their size is immense, a weight of 500 or 600 pounds being not unusual. They are also hardy, strong in constitution, and free from disease; and they are said not to be subject to mange. They

vary in color, in some neighborhoods being of a dark red, and in others quite sandy patched with white. A good specimen of a Jersey Red should be red in color with a snout of moderate length, large lop-ears, small head in proportion to the size and length of the body. They should be long in the body, standing high and rangy on their legs; bones coarse, hairy tail and brush, and hair coarse, inclining to bristle on the back.



DUROC SOW.

XVI Duroc Swine.

There is another breed of Red Swine named Durocs, which have been bred rather extensively in Saratoga county, N. Y., and have been known there for twenty-five years. They are finer in every respect than the Jersey Reds, and when mature attain great weights. They have been bred in some sections of the West with satisfaction, are more uniform in their make up, quite as good in their constitutions, and much finer in

their substance than the Jersey Reds. The origin of both the Jersey Reds and the Duroes was undoubtedly in the old-fashined Berkshire, a sandy hog with more or less black. This was not unusual with the Berkshires as we knew them and bred them over forty years ago—a hog in every respect different from the elegant and finished swine of the last fifteen years.

XVII. Summary of Breeds.

The English breeds of to-day that have been received with the most general favor in the United States are: First, the Berkshire, next the Essex, and third the Yorkshire. The Berkshire will weigh at full maturity 500 pounds, and the Essex 400 pounds. In exceptional cases they will average these weights. 350 pounds for Berkshire and 250 for Essex may be taken as good weights.

The Yorkshires in their three classes—small, medium and large—will weigh 250 pounds for the small, 350 pounds for the medium and up to 450 pounds for the large breed. They may, of course, be made to weigh much heavier at maturity if fully fat, and so may the other breeds mentioned. The so-called Prince Albert Suffolks are simply modified small Yorkshires, and the same may be said of the other sub-families called Suffolks. All these sub-breeds, including the Yorkshires, are pure white, and dark hair is not allowable, but bluish flesh marks or spots are not objectionable; on the contrary, they are an indication of purity of blood.

The most widely distributed of American breeds are: First, the Poland-China, and second the Chester county hogs. Well to the North the latter have been more widely disseminated than the former. In all the great corn growing region of the West, it may be safely said the Polands are the favorite of American breeds. The Jefferson county, the Jersey Reds and the Duroes, have never become widely known. We do not think the first has anything to recommend it over the small Yorkshire. They seem to have been too closely interbred, like particular families of Suffolks, a thing that should be especially guarded against in swine, since they are inclined more or less to scrofula and other cutaneous and sub-cutaneous diseases. For this reason, the Jersey Reds and Duroes, as being especially free from these taints, have been received with favor—notwithstanding their somewhat coarse quality—in many places subject to so-called hog cholera and other epidemic diseases.

CHAPTER III.

THE BREEDING AND CARE OF HOGS.

I. PRACTICAL VALUE OF IMPROVED BREEDS.——II. CARE IN SELECTION.——III. AGE OF BREEDING SWINE.——IV. HOW TO SELECT BREEDING ANIMALS.——V. FORM AND FEEDING QUALITIES.——VI. THE CARE OF BREEDING STOCK.——VII. FARROWING.——VIII. WEANING THE PIGS.——IX. CASTRATION.——X. GESTATION OF SOWS.——XI. NECESSITY OF GOOD CARE.——XII. RINGING A HOG.

I. Practical Value of Improved Breeds.

In no department of stock breeding has the value of superior breeds been more fully asserted than in the breeding of swine. Cheap food and the improvement of breeds have already made the West and Southwest the great swine-breeding and swine-feeding regions of the world, and eventually the Northwest and the South will share equally in the profits of these great industries. In all the West and Northwest, it is now difficult to find a farmer who has not swine of some one of the improved breeds. When the South, also, shall have taken hold of the business, in the extension of a diversified agriculture, millions of dollars will have been added to the wealth of that section. From what we have said in the preceding chapter, it should not be difficult for the young breeder to work understandingly and profitably. No money can be made by selecting any such species as the "prairie ranger," whose portrait is printed on an adjoining page. Nor can success be achieved by selecting a good breed, and starving the hogs, or allowing them to shift for themselves. Hogs of the improved breeds are not so well able to take care of themselves as those of a half-wild breed, but well cared for they will pay fifty per cent. in profit over the other breed, for the grain fed. Why? They are more quiet, and assimilate their food more perfectly. This is all there is to any superior breed of any farm stock, if we add that the flesh is better laid on in the prime parts.

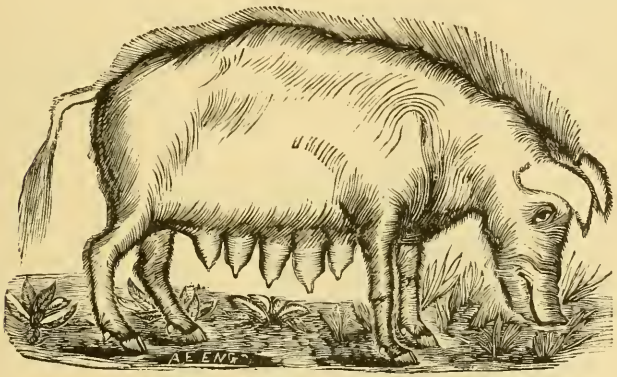
II. Care in Selection.

However good the breed, if care is not taken in the selection, or coupling of animals, degeneration of the offspring will inevitably result. This is true of all animals. But care in selection is even more clearly shown to be necessary in planting grains and vegetables, for the reason that weeds, poverty of soil, and the sowing of imperfect seed, react at once on the product. Hence the reason why seedsmen make fortunes in

selling improved seed that have been grown on rich soil, carefully selected, and all undersized seed screened out. Exactly the same care is necessary with breeding stock. Keep this up to the mark at any cost; those animals that do not come up to the standard can be used for food. Never sell the best seeds, nor the best animals, whatever may be offered; they are worth as much to you as any one else.

III. Age of Breeding Swine.

The boar is capable of coupling at from six to eight months old, but it is better that he be at least ten months of age before being allowed to serve. The sow is capable of breeding at seven or eight months old, but



A PRAIRIE RANGER.

it is better that she shall not drop her first litter until she is thirteen to fifteen months old.

Two litters of pigs each year is all the sow should be allowed to raise, and the best breeders are content with one litter a year. If the sow has a warm place for farrowing, the earlier in the season the pigs are produced, the greater is the profit from them. If they come the first of March, and are well fed until the new year, there is little difficulty in making them average 250 pounds each, and such pigs should bring fully one cent a pound more than hogs wintered once and weighing perhaps fifty pounds more. The profitable plan with swine of any breed is to push their fattening from the time they are born until they are killed, for with swine, as with other farm stock, the daily increase in flesh becomes less and less as the animal increases in age.

IV. How to Select Breeding Animals.

In the selection of stock for breeding, look first to constitutional vigor. Without this, no matter what the beauty of form may be, disaster will be brought to the herd. Next examine the form with reference to what you require. Then the question of early maturity and aptitude to fatten will be important. Then constancy of characteristics as shown in the progeny must be attended to, since this shows a perfect line of superior breeding, most valuable in any kind of farm animals. In all farm animals tractability and quietness of disposition are essential. In swine this is especially so. The subject of uniformity in the progeny is referred to in cattle under the title "heredity." It is worth reading again in connection with swine.

V. Form and Feeding Qualities.

Once you have secured an improved breed, or if you have made one by judicious crossing and selection, not only hold it so, but continue to improve it. Careful selection of animals that show the best points, is the important integer here, and the fixing them by breeding such animals

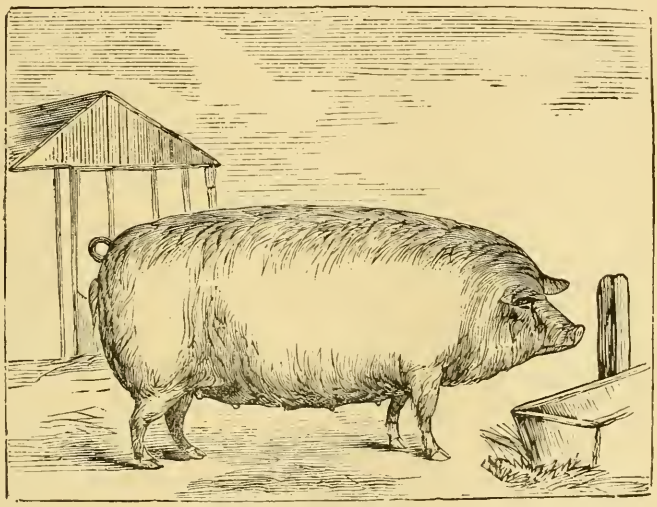
A BACK-WOODS HOG.

together in connection with good shelter and feeding is another. The best breed that ever existed, if they do not die in the degenerating process, will, if they must shift for themselves half the year, with barely enough to keep life in them the other half, soon come to look like the picture of "a back-woods hog", or that of the "prairie ranger." We see

them every day even in the best farming regions, among that class who have "no luck" in raising "critters." Why should they? They are degenerating, themselves, every day in the effort to get "something for nothing," or else for less than its value.

VI. The Care of Breeding Stock.

In a general way the same principles laid down for the care of other farm stock will apply to swine. There is one thing of special importance, however, in breeding swine, that must not be overlooked. That is the care that must be taken in not breeding too closely in-and-in. We have



A BREEDING SOW IN GOOD CONDITION.

shown in another part of this work that the tendency of this close breeding is to render the constitution delicate, and hence the vigor of the animal must suffer. Swine are especially susceptible to scrofula and other blood diseases, and also to inflammatory diseases. In-and-in breeding is apt to exaggerate these constitutional disabilities. For this reason special care must be taken, not only in the breeding, but in selecting for breeding purposes only those that show superior constitutional vigor. If you see a pig in a litter free from cough, that is superior in growth, and shows great constitutional vigor, save him or her by all means, for further examination. Save all such, and you will soon have stock superior to that originally bought; for the breeder of pure stock sells all indiscriminately,

except such as are actually deformed, or so far from the type that even the ignorant will notice the fault. They must do so, or else sell at such prices as to place stock out of the reach of all but the most wealthy. Once a breeder finds an animal right in every respect, some hundreds, or even a thousand, dollars over the usual price of average specimens of a breed is readily paid. Hence, in starting out, if your stock is not perfect you can easily improve it by selection and care in breeding. It is the object of this book to give the mass of farmers definite information on these points. The best breeders are already informed, and fully alive to their value.

VII. Farrowing.

In regard to farrowing, the farmer must be guided by circumstances. If the sows are expected to produce two litters of pigs a year, the first litter must come as early as March, so that the next litter may come early enough in the autumn for the pigs to be weaned and feeding before cold weather sets in.

When farrowing is expected in cold weather, a place warmed by fire heat must be provided, and the sow, especially if it be a young one, must be allowed perfect quiet. A temperature of not less than sixty-five degrees is necessary until the pigs are properly dried and take the teats. After that, they will do well under a temperature at night of about fifty degrees, yet sixty will be found better, for there is nothing more tender, or more susceptible to cold than a newly born pig, unless it be a young lamb. The sow having farrowed all right, she will generally take the boar again when the pigs are three or four days old. If not, she will not come in heat until after the pigs are weaned.

VIII. Weaning the Pigs.

The pig is born with teeth that will be ready to grind its food by the time it is two months old. We have always weaned at six weeks old, so far as spring pigs were concerned, allowing plenty of skimmed milk and buttermilk, mixing, at seven or eight weeks old, a fair proportion of corn meal mush, or, better, light wheat and rye screenings ground together. Give them grass, also, as soon as they will eat it, and at three months old they may be put on clover and whole, or, better, soaked corn.

IX. Castration.

Pigs should be castrated at from two to three weeks old; never delay it longer than the age of four weeks; since they require fully three weeks to recover from its effects before being weaned.

Castration is a simple operation. Let an assistant hold the pig on its back, with its head and shoulders between his knees and with the legs spread apart. With a sharp knife, cut down into the scrotum and through the testicle, press it out from the integuments, separate this from the testicle and with a jerk break the cord; or the cord may be cut with a dull pair of shears to prevent bleeding. The pigs will generally do well enough, though there is no objection to introducing a little melted lard and salt into the wound. If there is swelling the second day, inject into the cavity a little tincture of myrrh.

X. Gestation of Sows.

Gestation in the sow is accomplished in three months, three weeks and three days, as the average time. There is a variation sometimes of twenty and even thirty days. Young or weak sows carry their young a shorter period than older and stronger ones. Once you get a good breeding sow, keep her as long as possible, since young sows are often bad mothers. A sow will remain prolific for about eight years, unless she becomes overloaded with fat, and this must be guarded against.

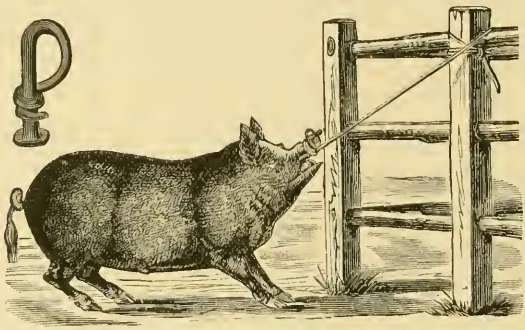
XI. Necessity of Good Care.

Swine have naturally but little hair, and artificial breeding has nearly destroyed what little they originally had. To supply this lack, nature has given them a thick layer of fat next the skin, when in good condition. Hence the necessity, not only of good feeding, but also of warm quarters and a good bed to lie in. Nature has also given them the instinct to carry together plenty of material for making their own beds, and also to lie together in families for mutual warmth. Knowing these facts, it should not be difficult for the sagacious farmer so to provide them with food and quarters, that they may be comfortable. If this is not done, and considerable numbers are kept together, they will "pile up" in cold nights so that in the morning the owner may have a chance to drag out some hogs dead from smothering. For when swine are piled up two or three thick, the under layer have no longer the power to move if they should try.

XII. Ringing a Hog.

We do not believe in ringing swine, except fattening stock and those fed in the fields with a view to fattening. We believe it one of the most prolific causes of disease and contagion, especially in preventing them from getting their natural food. Breeding stock should never have rings in their noses, at least until they are ready to be turned out for fattening.

Nevertheless, we suppose many will not think so. The illustration shows the old fashioned way of hampering a hog for ringing, and also the ring; now-a-days patent rings and ringing pincers render the process more easy. The old method was both clumsy and cruel; and except when necessary, rings of every kind should be discarded.



RINGING A HOG.

A hog that is turned out to forage in the woods on mast and roots should not, of course, be ringed; for he then needs free use of his snout which is the means nature provides him with for getting food. The reason why breeding swine should not be ringed is, that the natural exercise of rooting, and the food they get in this way, are necessary to develop constitutional vigor and perfect health, so important in all breeding stock. This point is touched upon more fully elsewhere.

CHAPTER IV.

THE FEEDING AND SHELTERING OF SWINE.

I. FEED THE BREEDERS FOR HEALTH.——II. THE PROPER FOOD FOR SWINE.——III. SUMMER FEEDING FOR PORK.——IV. GRASSES AND CLOVERS.——V. ROOTS.——VI. GRAIN THE MAIN RELIANCE.——VII. FEEDING IN THE FIELDS.——VIII. GLEANING IN THE FIELDS AND AFTER CATTLE.——IX. VALUE OF MAST FOR HOGS.——X. HOG-FEEDING IN THE SOUTH.——XI. FEEDING IN CLOSE PENS.——XII. HOG BARNS.——XIII. THE BEST FORM OF HOG BARN.——XIV. COMPARATIVE VALUE OF LIGHT AND HEAVY HOGS.——XV. ECONOMY OF FULL FEEDING FROM BIRTH.

I. Feed the Breeders for Health.

The only profit that can accrue from the care and management of swine lies in the value of their flesh as food, and in the offal for grease and in the arts. Hence the greatest profit—except in rare cases, where they have an unlimited forest range—lies in forcing their feeding to fatness, from birth until they are slaughtered. True economy will dictate that they have the warmest possible shelter in winter, and that they be kept cool in summer, with some place where they may escape from insect enemies, and with range sufficient for them to exercise their instinct of rooting for such underground vegetation as their natures may require. This promotes health and strengthens their constitutions.

The above applies especially to the breeding stock. Those animals which are intended for fattening—and whose lives should not extend beyond fifteen months at most—do not require all this. If the breeding stock have been kept healthy they will transmit health to their offspring. I believe that the purely artificial breeding and feeding of breeding stock, the indiscriminate ringing, the absence of roots, and the feeding of breeding animals almost exclusively on corn, have, in many cases, so enfeebled the constitution of swine that they have become an easy prey to the various epidemic and contagious diseases that, of late years, have carried off so many. And I believe, also, that the utmost care will be necessary in the future to guard against this disability. And any common-sense man may see that the breeding animals are so few in proportion to the slaughtering swine, that it is true economy for every breeder to spare no pains in providing for this class of stock diversified food which they crave, and which is necessary to make sound and vigorous constitutions.

Remember that swine—like man—are universal feeders, and that if allowed to be so, few animals are more cleanly in their habits. They wal-

low in the mud, at times, it is true, but a mud bath is nature's specific for scurvy and other skin diseases. Swine, also, take a mud bath as a refuge from insects; nevertheless they are careful, if allowed, to thoroughly clean themselves, when dry, against the rubbing post.

II. The Proper Food for Swine.

Swine eat fewer varieties of herbs and grass than any other animal. Pigweed (*amaranth*), pursley (*portulacca*) and various other succulent plants, with the common pasture grasses, and red and white clover are about the only ones swine will feed on. Artichokes and various tuberous and bulbous roots, many insects—especially the larvæ of the May beetle, and the white grub of our pastures—frogs, and such small animals as they can kill, together with all the edible grains, and culinary vegetables, constitute their natural food. In fact, they eat few substances that would be injurious to man. Such, then, is their proper food—so far as it may be obtained—if the highest constitutional vigor is to be preserved in the breeding stock. If they are allowed a fair range on clover, including the gleaning of grain fields in summer; and if a good supply of pumpkins, and the refuse fruit of the farm be allowed them in autumn; and if in the winter they be allowed daily rations of artichokes, small potatoes, parsnips or carrots, they may have, in addition, what grain they need to keep them in full flesh—not fat. If this course of feeding were generally adopted for the breeding stock, we should in a few years hear but little of the epidemics which periodically sweep the swine away by thousands. But as long as there are so many breeders who never look beyond present profits, these epidemics will probably continue to be bred among the herds of this class to scatter the germs far and wide.

III. Summer Feeding for Pork.

We now come to the care of fattening stock. The pigs having been weaned, as already directed, give them the run of a clover pasture; and, while we object to the ringing of breeding stock, with those intended for fattening it is, perhaps, less objectionable than the tearing up of the grazing fields. But if the grazing fields are infested with the larvæ of the May beetle or similar insects, the fattening hogs may as well be allowed to root as much as they want to. There is no cheaper way of ridding the land of these pests.

In addition to clover, give the young pigs all the milk and other slops of the house, and also give what corn they will eat; older pigs will do well enough on clover and corn, without the slops. Whether the grain shall be ground, or ground and cooked, will depend entirely on the price. We have always found whole grain the cheapest, except for finishing off,

when the price of corn was fifty cents per bushel or less; and here again economy will depend more or less upon the facilities for grinding and for cooking.

IV. Grasses and Clovers.

The main dependence for grazing will be blue grass, orchard grass, and red and white clover. Alfalfa—wherever it will grow—cut green, makes an excellent supplementary food, when swine get used to it; and field peas cut just before they shell are excellent for hogs.

V. Roots.

Artichokes, potatoes, ruta-bagas, parsnips, carrots, and beets, are readily eaten by swine, and are preferred in the order named. We have successfully wintered store hogs entirely on ruta-bagas with the addition of a little meal. Artichokes are a cheap and excellent root food, if the swine are allowed to gather them themselves in the autumn and spring.

VI. Grain the Main Reliance.

Grain, however, is, in the West, the cheapest food and the main dependence of the farmer. The other foods are useful mainly for keeping the animal in good health and digestion; for, without sound health and good digestion, no animal can be made fully fat. In the fall there is no better food than pumpkins and grain boiled together; and if the pumpkins are protected from frost, swine may be carried in this way until Christmas and made fully fat.

VII. Feeding in the Fields.

In all the great corn region of the West and South, field-feeding will long continue to be the favorite way of fattening hogs. It is cleanly, and, where grain is cheap, economical. It is only necessary to see that the hogs are made comfortable by shelter from storms and cold weather, and that they have plenty of pure water. This is so easy to do that the mere mention of it will suffice.

VIII. Gleaning in the Fields and after Cattle.

Swine should always have the run of the grain fields after harvest, if possible. In this way they save all the grain dropped in harvesting, and, most important, they get a variety of herbage, which they could not otherwise obtain. It should, of course, not interfere with their getting full rations of grain, and plenty of pure water for drinking must be provided, for swine are thirsty animals; and attention to providing a dark place where they may escape insects must not be forgotten.

So, in feeding cattle, swine should glean what is left. One or two hogs should follow each steer or cow, according to how much grain is fed to the hogs in addition. Our plan always was, to allow two hogs to each steer, and then at night to give the hogs what extra corn they would eat.

IX. Value of Mast for Hogs.

This will depend upon the range and the number of nut-producing trees. When a suitable range is to be had it should always be used, especially for breeding hogs, and young swine. For fattening, it will only be available in extensive forest districts, and for half-wild swine. In any event, hogs fed on mast should be allowed full feeds of grain for at least three weeks before slaughtering.

X. Hog Feeding in the South.

Swine-feeding can be profitably conducted on a large scale at the South, only in the more temperate regions where corn may be economically grown. There is, however, still so much forest area there, that it should be made use of to the fullest extent for hog pasture, on account of the natural roots, the wild fruit and the mast. The supplementary food must depend, as it does everywhere else, on the cost. If it has to be bought, corn and mill feed will be found the cheapest. Every planter should raise and cure enough hogs to furnish pork, bacon and hams for his home use. It will be found, in nearly every instance, cheaper than to buy the bacon and pork already prepared.

XI. Feeding in Close Pens.

In all cases, where few pigs are kept, or where only the family supplies of pork are fattened—especially when the fattening pigs are bought in the spring—it is cheapest to feed in close pens. These should always be in two apartments, one closed in for sleeping, and the other an open platform for feeding. A pen twelve by sixteen will accommodate six large hogs; and this will allow the sleeping room to be 8 by 12, and the feed room the same size. In every case where hogs are to be kept and fattened in cold weather, warm sleeping places must be provided; and even where large numbers of hogs were kept to be fed fully fat, we have found the plan of close pens to be most economical in the end.

XII. Hog Barns.

When many hogs are kept, a permanent structure should be built for fattening and wintering them. The simplest form of a hog barn is a low building, with ranges of pens on each side of a four-foot passage way, the sides being divided into pens eight feet square. This would give twenty feet for the width of the building. In the middle, a twenty-foot room should be left for the boiler, and for the storage of feed. The

sleeping apartments may be lean-to structures, back of the feeding rooms, and with a door to each, hung on hinges at the top, so it may easily swing either way when a hog pushes it. The pens must be cleaned into a wheelbarrow, rolled along the passage on a running way laid for dumping directly upon the compost heap.

XIII. The Best Form of Hog Barn.

The best form of hog barn we have ever used was a central building, twenty-four feet square and two stories high; the upper stories arranged with bins for meal, and a corn crib, with chutes running below. The twelve-foot square in the center of the lower story is used exclusively for the cooking apparatus, the first range of pens adjoining being for breeding sows and the younger pigs, since it is the warmest part of the building. Thence wings extend on each of the four sides, as in the plan of a hog barn first described, except that this being intended for both winter and summer feeding, a door communicating from the sleeping pens to a yard beyond should be added.

In this way we have kept five hundred hogs, and, by proper attention to their feeding and sanitary condition, always breeding our own stock with but slight loss from epidemics. The water supply was ample and pure. The pens were kept regularly washed; the offal was carried to the compost heap and covered regularly with earth; and the hogs had always by them ashes and salt, and also a supply of bituminous coal slack.

XIV. Comparative Value of Light and Heavy Hogs.

We have heretofore shown that an animal, if allowed to lose flesh when growing, does so at the expense of ultimate profits. This is especially true of swine. No feeder can afford to winter pigs with a view of getting heavy weights, unless under exceptional circumstances. It costs too much. Hogs weighing from 400 to 600 pounds will not bring so much per pound as lighter fat hogs, and with hogs as with other stock, every year they are kept their daily gain becomes less and less.

Hogs weighing 200 pounds, or thereabout, will bring more money in any market than those of any other weight; for hogs of this weight cut up better into hams, bacon, and family side pork, than heavier ones. No one wants a ham, for instance, that will weigh twenty-five to thirty pounds; there is too much fat on it for the lean. Thick bacon does not sell well, for very fat bacon is not liked. Hogs if properly fed may be turned off weighing 200 to 250 pounds at nine months old; and under ordinary good feeding, at ten or eleven months old. We have

raised pigs, farrowed in March, that in the succeeding January killed to dress up to 380 pounds, and have turned them off several times, that, at ten months old, would average 300 pounds alive.

To put the thing in a nut-shell, it is altogether cheaper to feed three pigs to 200 pounds each at nine months old, than it is to feed a hog three years to make him weigh 600 pounds; and again, if the pigs are worth six cents a pound alive, it is $36; the 600 pound hog will not then bring more than five cents, or $30, and has eaten more corn than the three lighter hogs.

XV. Economy of Full Feeding from Birth.

It should be remembered that it takes a certain percentage of the food to supply daily animal waste. The young animal converts into flesh more of the food given than a full grown one; no matter how long the animal is kept the daily waste goes on constantly. Hence, it should require no argument to show that the true economy is to feed strong from birth, if the object be simply to sell the animal when fat. When fat, sell at once, unless the state of the market is such that it will pay to hold for a time. Above all, do not allow the animal to fall away at any stage of growth, since it must be brought back at an increased cost of food over that originally given, to bring it to the condition at which it began to fail.

CHESTER COUNTY BREEDING SOW.

PART VI.

DISEASES OF SWINE.

HOW TO KNOW THEM; THEIR CAUSES, PREVENTION AND CURE.

Diseases of Swine.

CHAPTER I.

MALIGNANT AND EPIDEMIC DISEASES.

I. THE PREVENTION OF DISEASE.——II. MALIGNANT EPIZOOTIC CATARRH.——III. CONTAGIOUS FEVER OF SWINE.——IV. CONTAGIOUS PNEUMO-ENTERITIS.——V. SPLENIC FEVER, OR MALIGNANT ANTHRAX.——VI. SUMMARY OF TREATMENT FOR MALIGNANT DISEASES.——VII. RULES FOR DISINFECTION.——VIII. DIFFICULTY IN GIVING MEDICINE TO SWINE.——IX. WATCH SYMPTOMS EARLY, AND USE PREVENTIVES.

I. The Prevention of Diseases.

In the care of swine the prevention of disease is of the utmost importance. They are, indeed, subject to comparatively few ailments; but these few are, generally, in the shape of malignant, epidemic or contagious diseases of the most serious kind. In such cases the difficulty in administering medicine (they being too sick to take it with food) is very great. To prevent disease in swine, the most important thing is so to care for the animals that they shall be kept in general good health. The admission of other swine among the herd should, also, be prohibited until you are well assured that the new comers are free from disease. The herd should be perfectly isolated during the prevalence of epidemic or contagious diseases, and disinfectants should be freely used; when once serious disease makes its appearance in the herd, the sick animals should be carefully separated from the well ones. There is only one economical way to treat so-called hog cholera, which may appear in any of the following forms, viz: malignant epizoötic catarrh; intestinal "hog cholera," a specific contagious fever, attended by congestion, exudation, blood extravasation, ulceration of the membranes of the stomach and bowels, and fœtid discharges; contagious pneumo-enteritis or purples, a contagious inflammation of the stomach and bowels, with red or purple blotches of the skin; or the erysipelatous form of pneumo-enteritis, or that attended with malignant sore throat. When either of these forms of disease attacks swine, the cheapest way to treat it is to send the animals at once to the rendering tanks, and convert them into "grease," or kill and bury them at once, and thoroughly disinfect every possible place where contagion may lurk. If a competent veterinarian be near, apply to him at

once; but beware of quacks who go about doctoring hogs with so-called specifics; they are a delusion and a snare for the unwary.

II. Malignant Epizoötic Catarrh.

Causes.—This disease, if not actually generated in filthy yards and pens, is quickly and fatally developed in such places, and the poison germs quickly find their way to the mucous membranes of the animals. Anything that suddenly checks the insensible perspiration, as a cold, will quickly predispose to the disease.

How to know it.—There will be difficulty in breathing; panting; lifting of the flanks; and a short hoarse cough. There is fever; the head will be stretched out and drooping; sometimes running at the nose; efforts to vomit; generally constipation, but sometimes diarrhœa; and the animal will show a stiff tottering gait. After death, if the animal is opened, there will be found inflammation of the nasal passages of the upper part of the throat, and of the windpipe and lungs, which latter will be found more or less solidified.

A second form of the disease shows less cough; less difficulty in breathing, but decided paralysis, and tottering in the gait; there is constipation, followed by profuse and fœtid diarrhœa; the back arched; partial or total blindness; enlarged glands and scrofulous ulcers. After death the lining membrane of the intestines will be enlarged and degenerated; the spleen enlarged, soft and dark; the liver is also affected, and there may be water exudations in the chest and belly. The duration of either form will be about fifteen days.

What to do.—If the disease shows clearly the symptoms described, kill the animal and bury it deep. Separate all animals showing the slightest ailment, and give the following emetic:

No. 1. 15 to 20 Grains, powdered white hellebore,
½ Pint milk.

Mix and let the animal drink it, if it will; if not, turn it down with a horn, as described under Article VIII, in this chapter. When the dose has vomited the animal, if the symptoms are as first described or in the lungs, give

No. 2. 2 or 3 Grains tartar emetic.

If the symptoms are as described in the second form of the disease, or if the bowels are implicated rather than the lungs, give, instead, the following:

No. 3. 2 or 3 Grains calomel.

Either dose may be administered in the half of a roasted potato if the animal will eat. If not, envelop the dose in lard and place it well back

in the mouth on the root of the tongue. Apply over the sore spot, lungs or bowels, as the case may be, the following blistering ointment:

No. 4. 1 Ounce powdered cantharides,
4 Ounces olive oil.

Heat the two over a moderate fire for half an hour, stirring constantly, and rub it in well, repeating if it does not blister on the first application.

So soon as the animal gets relief, if the disease is in the lungs, give the following, every day for a few days; but if the trouble is in the bowels, omit the carbonate of potash:

No. 5. 20 Grains sulphate of iron.
30 Grains carbonate of potash.

If there are copious, dark discharges from the bowels, give

No. 6. 20 Grains podophyllin,
2 Drachms bi-carbonate of soda.
Mix in a pint of milk.

But, if there be constipation, give the following instead of No. 6:

No. 7. 1 Ounce castor oil.
1 Drachm oil of turpentine.
Mix in a pint of milk.

III. Contagious Fever of Swine.

This is sometimes called intestinal hog cholera.

Causes.—It is contagious and the infection is virulent, so much so that the germs are carried to considerable distances, supposably in the air. If not generated in foul pens and yards, they, together with bad care and management, cause it to develop quickly when the germs are once introduced.

How to know it.—Succeeding the incubation, which lasts from three days to two weeks, according to the season and temperature, there will be shivering; prostration; the nose hot and dry; the animal will not feed, but will lie under the litter; the eyes will be sunken; the gait weak and unsteady. There will be great thirst, and a clinical thermometer inserted into the rectum will show a temperature of 103° to 105° F. There will be heat and soreness of the skin, with red patches and black spots, the redness disappearing under pressure. The pulse will be weak but rapid; the tongue much furred; a hard dry cough, and quick breathing; the belly is sore and the animal will flinch and scream if it is handled; the bowels are costive sometimes throughout the disease, but generally as the disease progresses, or about the third day, diarrhœa, fœtid and exhausting, will supervene, and slime and blood may be passed, showing ulceration of the bowels. The last stage occasions stupor, paralysis of the hind limbs, with tremblings, jerking of the limbs and involuntary motions of the bowels.

What to do.—Kill and bury deeply all infected animals, unless they can be treated in a place where the atmosphere is constantly disinfected. Disinfect, also, all animals that may be near. Separate all animals in which the clinical thermometer, inserted into the rectum, shows a temperature of 100° F. or more. Give them charcoal, bi-sulphate of soda, 20 grains at a dose, mixed with the same quantity of nitrate of potassa; give also sulphate of iron (copperas), or the following:

No. 8.
2 Pounds flowers of sulphur.
2 Pounds sulphate of iron.
½ Pound nitrate of potash.
½ Pound black antimony.

This mixed in twelve gallons of slop will be enough for 100 hogs; or give each hog 1 pint at a dose, repeating every day.

Be sure the water used has not run through the premises of a diseased herd; use only pure well water, and be sure, also, that the food has not been contaminated; and if you have lately bought strange hogs, isolate them in a safe quarantine until assured they are all right.

Treatment of the sick.—Give cool pure well water, just acidulated with sulphuric acid, to drink. If there is constipation, give a mild dose of castor oil, say two ounces, and also give injections of warm water to assist the operation. Then give the following dose, repeated two or three times a day.

No. 9.
20 Grains nitrate of potassa,
20 Grains bi-sulphate of soda.
Mix in a pint of gruel, and give as one dose.

If the belly becomes tender, and bloody dung is passed, showing ulceration of the bowels, give fifteen or twenty drops of oil of turpentine, in a little gruel, night and morning. When the worst cases show signs of improving, give tonics, say 5-grain doses of quinine twice a day; or ½ drachm doses of sulphate of iron (copperas). This with nourishing, soft food, good nursing, and a most thorough disinfection, (see Article VII,) may bring them out.

IV. Contagious Pneumo-Enteritis.

This is a form of so-called "hog cholera," or purples. It is a contagious inflammation of the lungs and bowels with red or purple blotches on the skin, according to the relative form of the disease.

Causes.—Bad water, and malaria from filthy pens or swampy grounds, are prolific causes in hot or warm, wet seasons. A minute organism (*bacillus*) is found in the serous fluids and tissues of the body.

How to know it.—Charbon or malignant anthrax, also called hog cholera by those who want a better name, is sometimes confounded with

this disease. In some respects, indeed, the ignorant may easily confound them. Hence we give the symptomatic distinction of each, side by side, as stated by Dr. Klein:

CONTAGIOUS PNEUMO-ENTERITIS.	TRUE CHARBON.
—Period of incubation from two to five days and more.	—Period of incubation, or latency, from a few hours to three days.
Rarely and with difficulty transmitted to other species.	Easily transmissible to other species of animals.
Spleen rarely enlarged or otherwise changed.	Spleen always enlarged, and often broken down.
Blood after death of ordinary appearance.	Blood after death dark and fluid.
No *bacillus anthracis* in the blood, but numberless bacilly in the serum of the thorax and abdomen.	*Bacillus anthracis* in the blood.
Lungs and bowels *always both* inflamed. Cough always present.	Lungs and bowels frequently not implicated. Cough may be present.
The red or purple color diffused over the surface, and of an erysipelatous appearance.	The discoloration local, and of a true carbuncular appearance.

There are two forms of pneumo-enteritis, one the erysipelatous form, the other with malignant sore throat.

THE ERYSIPELATOUS FORM.—The animal is dull; will not eat; is unwilling to move; tries to vomit; there is cough; difficulty in urination; the bowels are constipated; the dung hard and black. Then dark red or purple blotches passing into bluish-black will appear about the ears, throat, neck, breast and between the fore-legs. There may be a discharge of dark or purple fluid from the nose; the breathing becomes labored, even to panting; there is paralysis of the hind limbs; if the animal is forced up, his head will drop to the ground, and he walks with a reeling gait behind. Fœtid diarrhœa sets in, and the animal dies in from one to three days.

WITH MALIGNANT SORE THROAT.—The symptoms in the commencement are the same as in the erysipelatous form, with a red and purple line about the throat; there are attempts to vomit; difficulty in swallowing; and the sensation of choking in breathing is so intense that the animal will sit on his haunches, gasping for breath with livid, protruded and swollen tongue. The symptoms so increase, sometimes, that the swelling of the larynx will kill, by choking, in an hour.

What to do.—Foment the swollen parts with hot water, saturated with sulphate of iron (copperas). If there are signs of gangrene, saturate the

surrounding parts with equal parts of turpentine and sweet oil. Give at once two ounces of castor oil, and when it operates, give the following two or three times a day:

No. 10. 20 Grains nitrate of soda,
20 Grains nitrate of potash.
Mix in a little gruel.

If the bowels are swollen and tender, give twenty drops of turpentine in a little gruel, as may be needed, and let the animal have powdered charcoal in the water it drinks.

Another valuable remedy is that of M. Lubin, to be given in gruel three times a day, omitting the calomel after the third dose. It is as follows:

No. 11. 5 Grains calomel,
1 Drachm nitrate of potash,
10 Grains powdered camphor.

This is a good dose for the swine not yet affected, and it may be used in any of the preceding diseases, as a preventive. The following has been found useful by Prof. J. B. Turner, of Illinois. It will be sufficient for 100 hogs, the dose being one pint for each hog:

No. 12. 2 Pounds flowers of sulphur,
2 Pounds sulphate of iron,
2 Pounds madder,
½ Pound black antimony,
½ Pound nitrate of potash,
2 Ounces arsenic.

Mix the whole in twelve gallons of gruel for 100 swine, or give one-pint doses to each.

V. Splenic Fever or Malignant Anthrax.

This disease is rare, and has even been asserted as not occurring in the United States. Yet, since charbon or malignant anthrax of cattle may be easily communicated to other animals and man, there is no reason why swine should not become victims.

The common form of Anthrax.—In pigs the most common form is a carbuncular swelling of the throat, extending inwards to the windpipe and gullet, causing difficulty in breathing and swallowing, and terminating in convulsions and death by strangling. It has been popularly known as white-bristle, from the peculiar appearance of the bristles about the parts. The treatment should be similar to that advised for pneumo-enteritis with malignant sore throat. (See article IV.)

The apoplectic or splenic form.—If this form of the disease should appear, it will be known by malignant inflammation of the internal organs, such as are noticed in bloody murrain in cattle. It is malignant blood poisoning, and so virulent is the infection that every tissue of the animal

is affected, and is poisonous to both man and beast, producing what is known as malignant pustule, if serum or blood or the flesh of the infected animal comes in contact with any abrasion of the skin.

Prevention.—Perhaps as good a preventive as any is prescription No. 12. But every animal infected had better be killed at once and buried deeply, and covered with quick lime.

VI. Summary of Treatment for Malignant Diseases.

As a last word, however, we repeat: Do not waste time in doctoring any but blooded hogs that are valuable enough to warrant perfect isolation and the necessary care in curing. The best precaution to take in all the diseases named, and which go under the general name "hog cholera," is disinfection, and the most thorough isolation of the sick from the well. If the sanitary conditions of the hospital are not strictly attended to, all other treatment is thrown away: and the attendants must thoroughly disinfect themselves before going about other swine. In fact, it is better that the attendants keep away from the well hogs altogether. Hence our advice: Thoroughly isolate all swine upon the first indications of disease, and if it does not give way quickly to treatment, kill and bury deeply at once.

VII. Rules for Disinfection.

The rules we give for disinfection, will apply to any structure, including barns, stables, sheds, and outhouses of every kind. Fumigants are not always disinfectants, and simply deodorizing or destroying odors, is not disinfection in any sense of the word.

The disinfection of all barns, stables, sheds, or other places where animals having malignant or contagious diseases have been kept, should receive strict attention. Every part should be stopped tight, and flowers of sulphur and wood tar, in the proportion of one pound of the former to two quarts of the latter, mixed with tow, should be burned and allowed to smoke thoroughly, until the whole building is thick with smoke. So the hospital should be fumigated with the same, two or three times a week, but not sufficiently to set the animals coughing. Every part of the building should also be thoroughly washed with dilute carbolic acid, and the clothing also wet with it. If pure carbolic acid is used for sprinkling floors or washing walls, 100 parts of soft water may be added to one pint of acid. The impure carbolic acid of gas works may be used undiluted. All discharges should be treated with chloride of zinc, dissolved in water, in the proportion of one ounce to one or two gallons of water. The attendants taking care of animals with malignant diseases should never approach or handle the well ones.

A disinfectant that has no smell and is not poisonous, known as chloralum, is made by dissolving three pounds of chloride of aluminum in two gallons of water, or in like proportions. Another cheap and powerful disinfectant, but poisonous, if taken, is made of eight ounces of chloride of zinc, sixteen ounces of sulphate of iron, and one gallon of water. Dissolve, and to each pint used add one gallon of water. Among disinfecting substances may be named chlorine. This is set free by adding oil of vitriol and a little black manganese to common salt, as a disinfectant of the air, but must be used in vacated buildings, and is better if used in the full light of day. So flowers of sulphur, burned by a heat only sufficient to produce smoke, will accomplish the same purpose, and if used carefully, it will not injure stock. A disinfectant that may be used in occupied buildings, is formed by adding a little chlorate of potassa, at short intervals, to half a pint of strong muriatic acid, in a strong vessel of glass, or heavily glazed stoneware.

VIII. Difficulty in giving Medicine to Swine.

The difficulty in getting swine to swallow medicine, when they are so sick they will not eat, is well known. Hence the difficulty in curing them when attacked with malignant disease. The easiest way we have ever found, is to have them in a pen where they cannot turn round; pass a slip-noose over the upper jaw, and the mouth being open, turn down liquids from a horn. In case doses in the form of pills or paste are prescribed, they may be placed well back on the root of the tongue.

IX. Watch Symptoms early and use Preventives.

The "ounce of prevention" in the case of swine, is worth many times more than the "pound of cure." Good nursing, isolation and thorough disinfection are really the chief, as they are the common-sense treatment. This has always been our practice, in connection with prompt killing and deep burial of those which did not yield to simple treatment. Any person by carefully studying what we have written, may pretty accurately judge when killing becomes necessary.

CHAPTER II.

THE COMMON DISEASES OF SWINE.

I. INFLAMMATORY DISEASES.——II. PNEUMONIA OR INFLAMMATION OF THE LUNGS.——III. QUINSY OR INFLAMMATION OF THE TONSILS.——IV. APOPLEXY, STAGGERS, OR CONGESTION OF THE BRAIN.——V. COLDS OR RISING OF THE LIGHTS.——VI. CATARRH OR SNUFFLES.——VII. MEASLES AND TRICHINA.——VIII. TRICHINA SPIRALIS.——IX. OTHER INTESTINAL PARASITES.——X. PARASITES OF THE SKIN—MANGE OR SCAB.——XI LICE.——XII. DIARRHŒA.——XIII. LEPROSY.——XIV. SKELETON OF THE HOG.

I. Inflammatory Diseases.

Swine are, from their nature and the manner in which they are kept, more subject to congestive and inflammatory diseases than any other farm animal. The results of this tendency are conspicuously seen in quinsy, coughs and colds, sometimes ending in consumption, and especially in inflammation of the lungs.

II. Pneumonia, or Inflammation of the Lungs.

How to know it.—By the rapid and laborious breathing, and shivering of the body and limbs. There will be a more or less severe cough, and the hog loses appetite.

What to do.—Put the animal in a comfortable, quiet and well ventilated place. Keep a preparation of mustard and tepid water on the chest and side, and give the following mixture:

No. 13. 2 Drachms bi-sulphate of soda,
2 Drachms nitrate of potash.

Mix in a pint of gruel and feed it to the patient, or turn it down from a horn. This may be repeated as necessity requires, and, if necessary, a blister may be applied to the chest; but good nursing, and such nourishing food as the hog will eat, should effect a cure.

III. Quinsy or Inflammation of the Tonsils.

This is a common and often fatal disease, if relief is not promptly given. It is an inflammation of the glands of the throat.

How to know it.—If you find that the hog has difficulty in swallowing; if slavering and protrusion of the tongue are seen, and especially if there be a swelling under the lower jaw and neck, you may be sure the animal has the quinsy.

What to do.—Cast the hog or pig, and with a thin, keen-bladed knife scarify the parts until the blood flows freely. Then foment the parts

with cloths wrung out of very hot water, applying them repeatedly to induce bleeding and reduce the inflammation. In the mean time the following should be prepared, to be used as soon as possible, as an injection:

No. 14. 4 Ounces sulphate of magnesia,
2 Drachms oil of turpentine,
½ Pint soap suds.

Mix, and inject into the rectum with a syringe. If the animal will eat, give the following, mixed in a little gruel:

No. 15. 2 Teaspoonfuls turpentine,
2 Teaspoonfuls lard oil.

If he will not eat, swab the tonsils often with the mixture by means of a swab fastened to a small rod, the mouth being held open, as previously described.

IV. Apoplexy, Staggers or Congestion of the Brain.

This disease is not unusual in fat hogs.

How to know it.—The animal will be stupid; the eyes red; the pulse hard and rapid; the bowels constipated. As the disease progresses, the animal becomes partially or wholly blind, going in a circle or striking against objects; and at last he falls unconscious. Sometimes the attack is attended with effusion on the brain, without other symptoms being especially noticeable; the animal falls suddenly; the limbs stiffen; froth flows from the mouth, and the breathing is hard, with a snorting sound.

What to do.—If cold water is not at hand, bleed freely from the jugular vein. The proper application is cold water allowed to fall upon the head from a considerable height. At the same time let an injection be quickly prepared and administered at once; use No. 14.

V. Colds, or Rising of the Lights.

Rising of the lights is what is generally called a cold. Keep the animal warm and quiet; feed well with easily digested food, and rub vinegar and mustard on the chest. If it does not yield to treatment, give a tablespoonful of tar every day, placing it well back on the tongue with a paddle. If the disease resolves itself into inflammation of the lungs, see treatment therefor in Article 11, of this chapter.

VI. Catarrh or Snuffles.

This is a common disease that usually disappears with warmth and good care, and light, digestible food. It sometimes assumes a chronic form, as nasal gleet, just as it does in man. When this is the case, the animal had better be killed at once and buried.

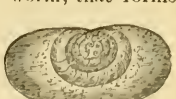
VII. Measles and Trichina.

Causes.—In swine measles is caused by a parasite (the bladder worm) from eating the eggs of the tape worm of man (*tænia solium*) in its food, just as trichina is caused by eating rats and mice or garbage containing the germs of this parasite; dogs, also, are well known to carry and void the eggs of the tape-worm, and hence care should be taken that swine do not eat their excrement. If the flesh of measly pork is eaten by man, without its being most thoroughly cooked, he will be just as surely infected with tape-worm as he would be with trichina if he ate trichina-infected pork. Hence, it is never safe to eat measly pork, since there is always danger that some of the cysts may escape death in cooking.

The tape-worm is a flat-bodied worm, made up of small segments or joints from a quarter to a half inch in length, joined end to end, with a depression between them. When full grown, the worm is from one inch to one hundred feet long. One end is narrow, being the head, which is globular and furnished with circular, sucking discs and a proboscis or snout, encircled by a row of hooklets. From the broad end the segments become detached and are expelled when ripe. These little segments may be seen wriggling along over the grass, vegetables and ground, and, as they go, they deposit innumerable quantities of eggs, which are taken up by grazing animals, especially the hog. It is estimated that a single tape worm lays upwards of 25,000,000 eggs. An egg taken into the stomach of a hog opens and hatches an ovoid, six-hooked embryo, which bores its way through the tissues till it finds a tissue congenial to its nature; and there it encysts itself and lies an indefinite length of time till, perhaps, it is eaten by a person, who becomes a feast for the tape-worm, which is developed very soon and causes intestinal pain, emaciation, nervous irritability, convulsions and, often, death.

HEAD OF TÆNIA SOLIUM.
Magnified, (Cobbold.)

The *cysticercus cellulosa* is the hydatid or bladder worm, that forms the measles in pigs; it becomes encysted in the muscles, liver, brain, mucous and serous membranes, etc.



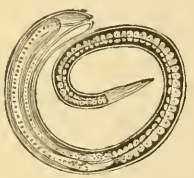
CYSTICERCUS CELLULOSA.—Magnified.

How to know it.—Measly pork is known by the cysts, some of which are nearly the size of a grain of barley, distributed through the muscular and other tissues. In the living hog, when infected, there will be found small, watery pimples of a pink or red color, just under the skin. There will also be weakness of the hind parts and general lack of health.

What to do.—Treatment is of little avail. If the difficulty could be known in time, daily small doses of sulphur and saltpetre, given for some weeks, might pass the eggs from the bowels; yet this is not certain. Keep the dogs about the place free from tape worms by occasional vermifuges, and burn all their dung when found.

VIII. Trichina Spiralis.

Trichinæ are found in all animals, but usually in man, the hog and the rat. They are almost microscopic, varying from one-eighteenth to one-sixth of an inch in length, and are among the most fatal of parasites. The mature and fertile worm lives in the intestines of animals, while the immature lives in cysts in the muscles. When the eggs first hatch, the young ones migrate through the intestines, and find their way into the voluntary muscles, that is, the muscles of motion; and in the course of six weeks they become encysted, and do no farther harm to the man or animal containing them; but during those six weeks the life or death of the victim is merely a question of strength to withstand the pain, exhaustion and emaciation, and many people die from it.



ADULT INTESTINAL TRICHINA SPIRALIS. MAGNIFIED.

How to know it.—The symptoms are swelling and great soreness of the muscles affected; pain; emaciation and exhaustion; it is often mistaken for rheumatism. In the lower animals, the same symptoms are seen as in man, but to a less marked degree: there is loss of appetite; stiffness in the hind parts; the muscles are sore, and the animal is loth to move. If those affected live through the six weeks, they will recover.

MUSCLE TRICHINA ENCYSTED. MAGNIFIED.

What to do.—During the six weeks give alcohol in half-ounce doses, three times a day in gruel, and a teaspoonful of sulphur in the food morning and night.

Prevention.—For people—never eat underdone pork, for trichinæ survive 140° F. Hams thoroughly smoked and boiled are safe.

For hogs—keep them remote from slaughter houses, and never feed them on the offal from slaughter houses. Keep their pens free from rats and mice. Pork fed on slaughter refuse, or kept near a slaughter house, ought to be examined with a microscope before being eaten. When a case has occurred, trace it to its origin and kill the hogs and burn the pen and manure.

IX. Other Intestinal Parasites.

These are numerous. The lard worm (*Stephanurus Dentatus*) and the kidney worm (*Eustrongylus Gigas*) are the most common, except those which produce the measles. Once they have found lodgment, there is little to be done, and the swine had better be killed immediately and converted into grease to avoid danger. The lard worm is from one to one and three-fourths inches long, by one-thirteenth inch broad, and is found in almost all parts of the body. It is often found in the liver, and the fat about the rib, heart the air passages, etc.

STEPHANURUS DENTATUS OR LARD WORM.

a, male; *d*, female; *c*, head magnified —(Verrill.)

The *Eustrongylus Gigas* is found in the kidneys, which it lives on till the whole is eaten, and then it attacks the capsule enclosing the kidney and eats its way through into the intestinal cavity, and causes death from nervous prostration or inflammation. The kidney worm grows to enormous size—the *gigas* means the giant—it being found from one to three feet long and from a quarter to a half inch in diameter. It is sometimes found in the intestines.

X. Parasites of the Skin—Mange or Scab.

Scab is produced by a small itch insect (*Sarcoptis Suis*), and the disease may be communicated to man. If the animals appear uneasy

EUSTRONGYLUS GIGAS (Cuvier.)

examine them with a glass. Mange should be no more tolerated than the itch in children.

What to do.—Give the animal, immediately, and thereafter once a day for a fortnight, the following as a dose:

No. 16. ½ Ounce flowers of sulphur,
1 Drachm nitrate of potash.

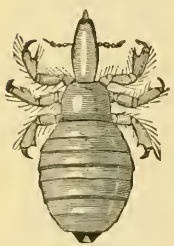
Mix as a powder, and give in the food. Rub the animal thoroughly with soft soap, and at the end of an hour clean well with warm rain water. When dry, prepare the following:

No. 17.
1 Pint train oil,
2 Drachms oil of tar,
1 Drachm petroleum,
Flowers of sulphur to form a thick paste.

Rub this thoroughly in, and let it remain three days. Then wash thoroughly with strong soap suds, and if the difficulty is not removed, repeat the application of the ointment. The animals must be changed to perfectly clean quarters, with clean bedding. Burn all old bedding, and paint the floor cracks, and every surface outside and in, with quick-lime, slaked with carbolic acid, one part to one hundred of water; or get the carbolic liquor from the nearest gas-works, and slake with that.

XI. Lice.

There would seem no reason why swine should be infested with lice. If they be suspected, examine the hogs, and when dry, after washing with soft soap and water, sponge freely with crude petroleum, and give daily, for some days, ¼ drachm of copperas in the food. If any lice remain, apply an ointment of Scotch snuff and lard to the infested parts.



HÆMATOPINUS.

Blood-sucking louse of the pig.

XII. Diarrhœa.

Young pigs are often taken with diarrhœa, generally during the first ten days after birth. The difficulty lies in the milk of the sow, either from bad food or other disability.

What to do.—Give good, nourishing food, of which sound grain is the basis; place a mixture of powdered charcoal and salt where the pigs and sow may freely take it. Prepare the following:

No. 18.
2 Pounds powdered fœnugreek seed,
2 Pounds powdered anise seed,
2 Pounds powdered chalk,
1 Pound powdered gentian,
2 Ounces carbonate of soda.

Mix, and give a tablespoonful to the sow every time she is fed.

XIII. Leprosy.

We have received accounts of hogs affected with "hog cholera"—every disease for which no better name is known is now so called—in which pimples and blisters appear about the mouth and eyes, prostration ensues,

the animal staggers when moving, and death follows sometimes with great emaciation. In Europe this disease is called Leprosy—a misnomer as much as to call it "hog cholera." It is, perhaps, a form of malignant punphigus.

What to do.—Allow the hog a clean, cool, well ventilated, place with cool water to drink, and, if possible, pure water for a bath. Cleanse the skin with soft soap and water, and dress the sores with tar, or ointment No. 17.

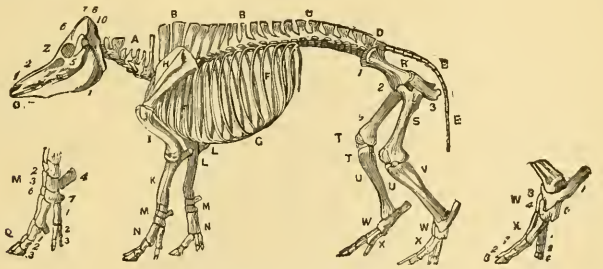
Give, twice a day, the following, in gruel or anything the animal will best eat:

No. 19. ½ Ounce flowers of sulphur.
1 Drachm nitrate of potash.

The disease is contagious, and want of care, dirty pens, and foul feeding are superinducing causes.

XIV. Skeleton of the Hog.

For a better understanding of the anatomy of the hog, the lettered and figured illustration of the skeleton will be found instructive. The first series of figures, following the capitals, refer to the bones of the fetlock and feet. The figures following Phalanges 1, 2, 3, refer to the hinder parts. The last series of figures following Z—Head, indicate the bones of the head. The reader will have no difficulty in recognizing and learning the names.



SKELETON OF THE HOG.

Names of the Bones.—*A*—Cervical vertebræ. *B*, *B*—Dorsal vertebræ. *C*—Lumbar vertebræ. *D*—Sacrum. *E*, *E*—Coccygeal bones. *F*, *F*—Ribs. *G*—Costal cartilages. *H*—Scapula. *I*—Humerus. *K*, *K*—Radius. *L*—Ulna. *M*—Carpus, or knee. 1. Scaphoid. 2. Semilunar. 3. Cuneiform. 4. Trapezium. 5. Trapezoid. 6. Os magnum. 7. Unciform. 8. Pisiform. *N*, *N*—Large metacarpal, or

cannon. *O*—Small metacarpal. *P*, *P*—Sesamoid bones. *Q*, *Q*—Phalanges. 1. Os suffraginis, or pastern bone. 2. Os coronæ. 3. Os pedis. *R*—Pelvis. (Fore-leg of pig. Phalanges 1, 2, 3). 1. Ilium. 2. Pubis. 3. Ischium. *S*—Femur. *T*—Patella. *U*—Tibia. *V*—Fibula. *W*—Hock. 1. Os calcis. 2. Astragalus. 3. Cuneiform magnum. 4. Cuneiform medium. 5. Cuneiform parvum. 6. Cuboid. 3, 6. Cubo cuneiform. *X*—Large metatarsal. (Hind-leg of pig. Phalanges 1, 2, 3). *Y*—Small metatarsal. *Z*—Head. 1. Inferior maxilla. 2. Superior maxilla. 3. Anterior maxilla. 4. Nasal bone. 5. Molar. 6. Frontal. 7. Parietal. 8. Occipital. 9. Lachrymal. 10. Squamous-tempoid. 11. Petrous-tempoid.

SHEEP-RUN.

PART VII.

SHEEP AND SHEEP HUSBANDRY.

EMBRACING

ORIGIN, BREEDS, BREEDING AND MANAGEMENT;

WITH FACTS CONCERNING GOATS.

SHEEP AND SHEEP HUSBANDRY.

CHAPTER I.

ORIGIN, ANATOMY AND POINTS.

I. NATIVE COUNTRY OF SHEEP.——II. THEIR DIVERSIFIED CHARACTER.——III. ANATOMY OF THE SHEEP.——IV. TOP AND VERTICAL VIEWS OF SKULL.——V. DENTITION OF SHEEP.——VI. POINTS OF SHEEP EXPLAINED.——VII. DIVISIONS OF FINE WOOL.——VIII. COMPARATIVE VALUE OF FINE AND COARSE WOOL.——IX. RANGING AND FLOCKING OF DIFFERENT BREEDS.——X. REGIONS ADAPTED TO SHEEP.——XI. POINTS OF EXCELLENCE OF THE PRINCIPAL BREEDS.——XII. STANDARD FOR AMERICAN MERINOS.——XIII. STANDARD FOR MIDDLE-WOOLED SHEEP.——XIV. STANDARD FOR COTSWOLD SHEEP.

I. Native Country of Sheep.

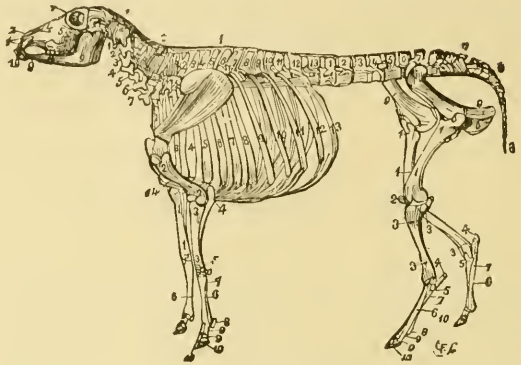
The native country of sheep is not known, and has not been since the earliest historical times. There are no wild sheep known, if we except the *Ovis Montana*, or wild sheep of Montana, in the United States, though at the Paris exhibition of 1865, several wild (so-called) sheep were exhibited, although bred in confinement. Among these were the wild sheep of Barbary, *Ovis Tragelapus*, more resembling a goat than our wild species, which is really a sheep; and also the Punjaub wild sheep, *Ovis Cycloceras*, a native of Northern India, and the European mouflon, *Ovis Musimon*, belonging to Corsica and Sardinia.

II. Their Diversified Character.

That sheep were the earliest domesticated of any of the wild animals, there is no doubt. Abel was a keeper of sheep, the first recorded shepherd or herdsman of any kind. The great length of time since their domestication, is also shown by their widely diversified character. The classification of Linnæus shows: The Hornless, Horned, Black-faced, Spanish, Many-horned, African, Guinea, Broad-tailed, Fat-rumped, Bucharian, Long-tailed, Cap-bearded, and Bovant. To these may be added the Siberian sheep of Asia, found also in Corsica and Barbary, and

the Cretan sheep of the Grecian Islands, Hungary, and some portions of Austria, making about all the principal sub-species.

III. Anatomy of the Sheep.



SKELETON OF LEICESTER SHEEP.

Explanation.—Beginning with the head, the references to cut of skeleton show: 1—The internaxillary bone. 2—The nasal bones. 3—The upper jaw. 4—The union of the nasal and upper jaw bone. 5—The union of the molar and lachrymal bones. 6—The orbits of the eye. 7—The frontal bone. 9—The lower jaw. 10—The incisor teeth or nippers. 11—The molars or grinders.

The Neck and Body.—1, 1—The ligament of the neck, supporting the head. 1, 2, 3, 4, 5, 6, 7—The seven vertebræ, or bones of the neck. 1—13—The thirteen vertebræ, or bones of the back. 1—6—The six vertebræ of the loins. 7—The sacral bone. 8—The bones of the tail, varying in different breeds from twelve to twenty-one. 9—The haunch and pelvis. 1—8—The eight true ribs with their cartilages. 9—13—The five false ribs, or those that are not attached to the breast bone. 14—The breast bone.

The Fore Leg.—1—The scapula or shoulder-blade. 2—The humerus, bone of the arm, or lower part of the shoulder. 3—The radius, or bone of the forearm. 4—The ulna, or elbow. 5—The knee, with its different bones. 6—The metacarpal or shank-bones; the larger bones of the leg. 7—A rudiment of the smaller metacarpal. 8—One of the sessamoid bones. 9—The two first bones of the foot; the pasterns. 10—The proper bones of the foot.

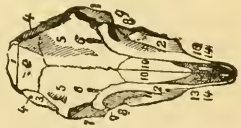
The Hind Leg.—1—The thigh bone. 2—The stifle joint and its bone, the patella. 3—The tibia, or bone of the upper part of the leg. 4—The point of the hock. 5—The other bones of the hock. 6—The metatarsal bone, or bone of the hind leg. 7—Rudiment of the small metatarsal. 8—A sessamoid bone. 9—The two first bones of the foot, the pasterns. 10—The proper bone of the foot.

It will be seen that the general anatomy of the sheep corresponds to that of the ox. In the limbs we find the number of joints the same in the horse, ox and sheep. Beneath the fetlock, however, the four bones are doubled in the sheep.

IV. Top and Vertical Views of Skull.

The first illustration shows the skull of a polled sheep as seen from the top.

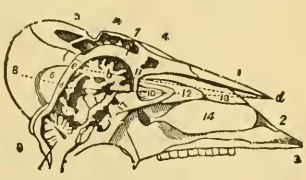
Explanation.—1—Occipital bone, depressed out of danger. 2—The parietal bones, the suture having disappeared, and also out of danger. 3—The squamous portions of the temporal bone—the buttress of the arch of the skull. 4—The meatus auditorius, or bony opening into the ear. 5—The frontal bones. 6—The openings through which blood-vessels pass, to supply the forehead. 7—The bony orbits of the eye. 8—The zygomatic or molar bones, very much developed. 9, 10—The bones of the nose. 11—The upper jaw bone. 12—The foramen, through which the nerve and blood-vessels pass, to supply the lower part of the face. 13—The nasal processes of the intermaxillary bones. 14—The palatine processes. 15—The intermaxillary bone, supporting the cartilaginous pad, instead of containing teeth.



SKULL OF A POLLED SHEEP.

Next we give a vertical section of the head with its appropriate explanation.

Explanation.—1—Nasal bone. 2—Upper jaw bone. 3—Intermaxillary bone supporting the pad, supplies the place of upper front teeth. 4, 4—The frontal sinus. 5—Cavity or sinus of the horn, communicating with the frontal sinus. It is here shown by removal of a section of the base of the horn. 7—The frontal bone. 8—Vertical section of the brain. 9—Vertical section of the cerebellum. *a*—The cineritious portion of the brain. *b*—The medullary portion of the brain. 10—The ethmoid bone. 11—The cribiform



HEAD OF SHEEP—VERTICAL SECTION.

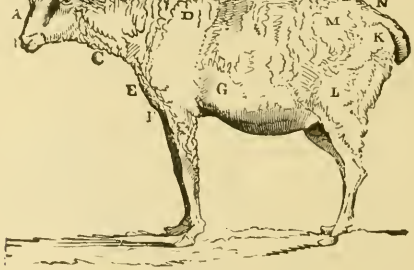
or perforated plate of the ethmoid bone. 12—The lower cell of the ethmoid bone. 13—The superior turbinated bone. 14—The inferior turbinated bone. 17—The sphenoid bone.

V. Dentition of Sheep.

Youatt gives as follows the dentition of sheep, by which it will be easy to tell the age correctly: The sheep has eight incisors in the lower jaw, and twelve grinders — six on a side in each jaw, — making in all thirty-two teeth. At birth the lamb should have the two central incisors just pushing through. At a month old all the incisors should be up. At one year, sometimes not until fifteen months old, the two first milk incisors will be shed, and two new or permanent ones will appear. At two years old past, it will have two more permanent teeth, or four in all. At three years old past, it will have six permanent incisors, and at four years old past, the eight permanent teeth, or a full mouth, as it is called, will be shown. This will be an accurate test as to the age of sheep, up to four years, varied of course, by care and keep; highly fed sheep developing faster than ill kept ones. At six the incisors begin to decrease in breadth, and lose their fan shape, as seen at four years old. At seven they become longer and narrower, and each year this shrinkage continues, until at last they become quite slender, the middle ones long, and at ten years they loosen and begin to drop out.

VI. Points of Sheep Explained.

To locate the different exterior portions of the sheep, we give a cut of one of the half-wild breeds of the animal, which seems goat-like, but the wool of which shows it to be a sheep.

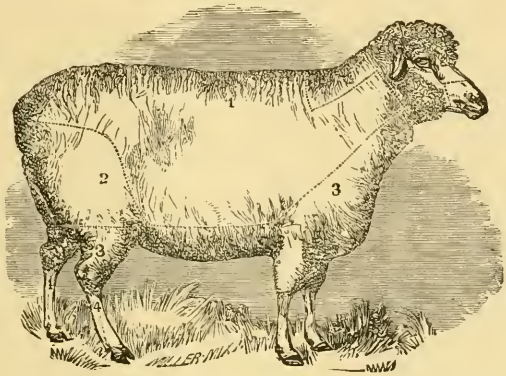


EXTERIOR POINTS OF SHEEP.

Explanation.—*A*—Face. *B*—Muzzle. *C*—Neck. *D*—Shoulder. *E*—Point of the Shoulder. *F*—Breast. *G*—Girth-place. *H*—Back. *I*—Loin. *K*—Rump. *L*—Thigh. *M*—Hip. *N*—Root of Tail.

VII. Divisions of Fine Wool.

To illustrate the divisions of the wool we give a figured cut of a fine-wooled sheep. The divisions are numbered to correspond to pure Saxon and Merino sheep, which when pure-bred, show only four qualities of wool. However, the cross-breds and especially grades sometimes show seven or eight.



DIVISION OF WOOL.

Explanation.—The *refina*, or pick wool, (1) begins at the withers, and extends along the back, to the setting on of the tail. It reaches only a little way down on the quarters, but dipping down at the flanks, takes in all the superior part of the chest, and the middle of the side of the neck to the angle of the lower jaw. The *fina*, (2) a valuable wool, but not so deeply secreted, or possessing so many curves as the *refina*, occupies the belly, and the quarters and thighs, down to the stifle joint; (3) is found on the head, the throat, the lower part of the neck, and the shoulders, terminating at the elbow, (fore legs,) and reaching from the stifle to a little below the hock; (4) is procured from the tuft that grows on the forehead and cheeks, from the tail, and from the legs below the hock.

VIII. Comparative Value of Fine and Coarse Wool.

Up to twenty years ago, fine wool was the most valuable, and the fineness of the fiber increased the price per pound in corresponding ratio. Then the exceeding fineness of broadcloth was the limit and standard of highest excellence. Of late years the demand for long and worsted wools

has steadily increased, with the change in fashion for gentlemen's wear; and the demand for worsted, combing, and other long wools is steadily growing, and at prices altogether in advance of the fine wools. Hence the larger breeds of sheep, once principally valuable for their mutton, sprung suddenly into favor for their wool. In England, the value of a sheep is rated fully as much for the carcass as for the wool. In the United States and in Canada, to a considerable degree, the wool is still the principal object; so the saying that, an Englishman in examining a flock, would ask, "how much will they dress," while the question of an American would be, "how much will they shear," still holds good.

Nevertheless, this is gradually changing; and the increased consumption of prime mutton in our large cities, and the increased facilities for ocean transportation of live animals, have stimulated more and more the breeding of mutton sheep. The probability is, that the fashionable fabrics made of the wools mentioned will not soon go out of use for summer wear, since they are altogether superior to cotton and linen, both in coolness and the ease with which they may be kept clean.

Fine wools, on the other hand, will never be superseded for winter wear, for blankets, for underclothing, and the endless variety of uses for which they are adapted.

IX. Ranging and Flocking of Different Breeds.

It is not generally known that there are peculiarities in sheep husbandry, especially in the flocking of herds, which cannot be overcome. The most important of these is, that the mutton and long-wooled breeds cannot be carried in large flocks. Merino and other fine-wooled breeds may easily be carried in flocks of even 1000 and upwards, on suitable soils; but the large breeds cannot successfully be carried in flocks of more than 100 together. Hence the adaptability of the Western plains and of Texas and New Mexico to the fine-wooled breeds, individual owners numbering their flocks by many thousands each. On the other hand, the large breeds are the favorites among farmers in the thickly settled portions of the United States, where they are kept in flocks of from twenty up to several hundreds.

X. Regions Adapted to Sheep.

It has generally been thought that only rocky, hilly regions are well adapted to the keeping of sheep. This is a mistake. Such regions are suited to sheep, no doubt, for sheep require a firm soil; sheep, also, can subsist in rocky, barren regions where other animals would starve. Yet any dry situation adapted to grass possesses all the necessary essentials. The Western prairies, which, except for a short time in the spring, are firm and dry, are most admirably adapted to sheep. All the hill

regions of the South are eminently suited for sheep husbandry, especially for the mutton and long-wooled breeds. There are found the essentials of a genial climate, plenty of range, pure water, sweet grasses, and a soil natural to sheep. There is only a single drawback—the number of dogs that are allowed to wander at will to decimate flocks. If the dogs were abated, the hill regions of the South would soon prove as valuable for sheep as for fruit and for general agriculture.

XI. Points of Excellence of the Principal Breeds.

The standards of excellence, now generally adopted at the St. Louis fair, at the Illinois State fair, and at many other prominent Western fairs, and also at the great exhibition of live stock at the Chicago fair for 1881, may be taken as being as near perfect as possible, and will rule in all points except, perhaps, in the weight of the carcass. In the East, and in some portions of the hill region South, the weight of carcass may be reduced some twenty pounds. Thus the standard of 165 pounds gross weight for a Merino ram, and 120 pounds for gross weight of Merino ewe, was reduced to 140 and 100 pounds respectively at the Centennial Exhibition, while in other respects the standards were identical. At St. Louis, the heavy standard known as the Illinois standard is, without modification, used for judging sheep. This standard, in fact, was really arranged by prominent breeders of Illinois, and of the country contiguous to St. Louis, we believe. The standards for the several grades will be found adapted to any breed; that for Cotswolds, applying to any long-wooled breed with very simple modifications. The standards are as follows:

XII. Standard for American Merinos.

	Points.
Blood.—Thoroughbred, *i. e*, purely bred from one or more of the direct importations of Merino sheep from Spain prior to the year 1812, without the admixture of any other blood. - -	1
Constitution.—Indicated by form of body; deep and large breast cavity; broad back, heavy quarters, with muscular development forming capacious abdomen; skin thick, but soft, of fine texture, and pink color; expansive nostril, brilliant eyes, healthful countenance, and good size, age considered. - - - - -	15
Size.—In fair condition, with fleece of twelve months' growth, full-grown rams should weigh not less than 165 pounds, and ewes not less than 120 pounds. - - - - - - - - -	7
General Appearance.—Good carriage, bold style, elastic movement, showing in particular parts, as well as general outline and symmetry of form. - - - - - - - - -	3

Points.

Body.—Throughout, heavy bones, well proportioned in length; smooth joints; ribs starting horizontally from back-bone, and well rounded to the breast-bone, which should be wide, strong, and prominent in front; strong back-bone, straight and well proportioned as to length; heavy, muscular quarters, deep through, and squarely formed behind and before, with shoulders well set on, neither projecting sharply above the back-bone, nor standing so wide and flat as to incur liability to slip-shoulders. - 8

Folds and Wrinkles.—Folds on the ram should be larger than on the ewe. Large and pendulous folds from the chin or jaws, succeeding each other down the neck to the brisket, ending with large fold or "apron," and extending up the sides of the neck, but lighter if at all extending over top of neck; two or three behind the fore leg or shoulder; one on front of hind leg, hanging well down across the flank; two or more on rear of hind legs or quarters, extending up towards the tail, with one or two on and around the tail, giving the animal a square appearance on the hind quarters, and straight down as may be from end of tail to hock joints and hind feet. In addition to folds, small wrinkles over the body and belly are desirable, as forming compactness of fleece, but not large enough to be apparent on the surface of grown fleece, or to cause a jar in its quality, thus leaving the body of the fleece even in quality, and free from the jar of large folds over the body. - - - - - - - 10

Head.—Wide between the eyes and behind the ears and across the nose; short from top of head to tip of nose; face straight, eyes clear and prominent; ears thick, medium size, and, together with the face, nose and lips, white, covered with soft fur or downy wool. Ewes should give no appearance of horns, while upon the rams the horns should be clear in color, symmetrically curved, without tendency to press upon the sides of the head or to extreme expansion. - - - - - - - 6

Neck.—Medium length, good bone and muscular development, and, especially with the rams, heavier, toward the shoulders, well set high up, and rising from that point to the back of the head. - - - - - - - - - - - - 5

Legs and Feet.—Legs medium or short in length, straight and set well apart forward and back; heavy bone, smooth joints, with large muscular development of the fore-arm; thick, heavy thighs, wide down to hock joints, and from knee joints downward covered with short wool, or the soft furry covering peculiar to the ears and face; hoofs well shaped and of clear color. - 5

Points.

COVERING.—Tendency to hair and gare upon any part of the sheep is to be avoided. Evenness of fleece in length, quality, density, lustre, crimp, trueness, strength and elasticity, covering the entire body, belly and legs to the knees; head well covered forward, squarely to a line in front of the eyes; well filled between the eyes and the ears or horns, and well up on the cheeks; muzzle clear, with small opening up to and around the eyes. Scrotum of rams covered with wool, free from tendency to hair. - - - - - - - - 15

QUALITY.—Medium, but such as is known in our markets as fine delaine and fine clothing wool, distinctly better in quality, lustre, crimp and elasticity, than the wools of same length grown upon the common grade sheep. - - - - - - 5

DENSITY.—Shown by the compactness of the fleece throughout, which should open free but close, showing very little of the skin at any point, even at the extremities of the fleece. - - 10

LENGTH.—At one year's growth not less than two and one-half inches, and as nearly as may be uniform in length to the extremity of the fleece. - - - - - - 5

OIL.—Evenly distributed; soft and flowing freely from skin to surface; medium in quantity. . - - - - 5

100

XIII. Standard for Middle-Wooled Sheep.

Points.

BLOOD.—Purely bred from one or more of direct importations from Great Britain. - - - - - - 10

CONSTITUTION AND QUALITY.—Indicated by the form of body; deep and large in breast and through the heart; back wide, straight, and well covered with lean meat or muscle; wide and full in thigh, deep in flank; skin soft and pink color; prominent eyes and healthful countenance. - - - - - 25

SIZE.—In fair condition, when fully matured; rams should weigh not less than 200 pounds, and ewes not less than 175 pounds. 10

GENERAL APPEARANCE AND CHARACTER.—Good carriage; head well up; elastic movement, showing symmetry of form and uniformity of character throughout. - - - - - 10

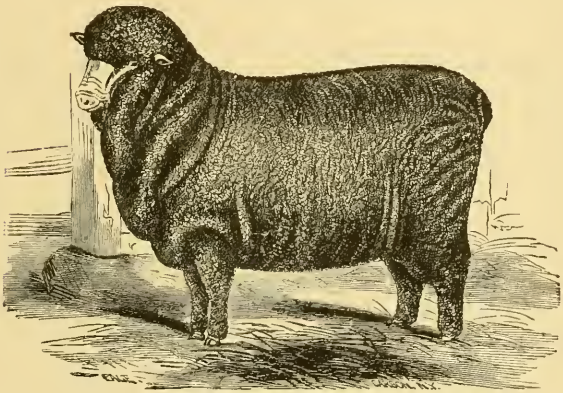
BODY.—Well proportioned; small bones; great scale and length; well finished hind quarters; thick back and loins; standing with legs well placed outside; breast wide, and prominent in front. - - - - - - - - - - 10

	Points.
Head.—Short and broad: wide between ears, and well covered with wool; color dark grey; light muzzle not objectionable; ears short.	10
Neck.—Short and heavy, especially toward shoulders.	5
Legs and Feet.—Short and well set apart; color dark grey, and wooled to the hoof, which must be well shaped.	5
Covering.—Body, belly, head and legs well covered with fleece of even length and quality; scrotum of rams also well covered.	10
Quality of Wool.—Medium, such as is known in market as half-combing wool.	5
	100

XIV. Standard for Cotswold Sheep.

	Points.
Head.—Not too fine, moderately small, and broad between the eyes and nostrils, but without a short, thick appearance, and in young animals covered on crown with long lustrous wool.	8
Face.—Either white or slightly mixed with grey, or white dappled with brown.	4
Nostrils.—Wide and expanded; nose dark.	1
Eyes.—Prominent, but mild looking.	2
Ears.—Broad, long, moderately thin, and covered with short hair	4
Collar.—Full from breast and shoulders, tapering gradually all the way to where the head and neck join. The neck of ram should be short, thick and strong, indicating constitutional vigor, (neck of ewe should be fine and graceful) and free from coarse and loose skin. [Collar 5 points with ewe.]	6
Shoulders.—Broad and full, and at the same time join so gracefully to the collar forward and the chine backward as not to leave the least hollow in either place.	8
Fore-legs.—The mutton on the arm or fore-thigh should come quite to the knee. Leg upright with heavy bone, being clear from superfluous skin, with wool to fetlock, and may be mixed with grey.	4
Breast.—Broad and well forward, keeping the legs wide apart; girth or chest full and deep.	10
Fore flank.—Quite full, not showing hollow behind the shoulder. [4 points with ewe.]	5
Back and loin.—Broad, flat and straight, from which the ribs must spring with a fine circular arch.	12
Belly.—Straight on underline. [5 points with ewe.]	3

	Points.
Quarters.—Long and full, with mutton quite down to the hock	8
Hock.—Should stand neither in nor out. - - - - - -	2
Twist.—Or junction inside the thighs, deep, wide, and full, which, with a broad breast, will keep the legs open and upright. -	5
Fleece.—The whole body should be covered with long, lustrous wool. - - - - - - - - - - - -	18
	100



STANDARD MERINO EWE.

CHAPTER II.

VARIETIES OF SHEEP AND THEIR CHARACTERISTICS.

I. LONG-WOOLED ENGLISH SHEEP.——II. LINCOLN SHEEP.——III. ROMNEY MARSH SHEEP.——IV. LEICESTER SHEEP.——V. THE COTSWOLDS.——VI. NEW OXFORDSHIRE SHEEP.——VII. THE OXFORD-DOWNS.——VIII. MIDDLE AND SHORT-WOOLED BRITISH BREEDS.——IX. WHITE-FACED MOUNTAIN SHEEP.——X. BLACK-FACED HIGHLAND, OR SCOTCH SHEEP.——XI. HAMPSHIRE-DOWNS.——XII. SHROPSHIRE-DOWNS.——XIII. SOUTH-DOWNS.——XIV. OTHER BREEDS OF GREAT BRITAIN.——XV. DORSET SHEEP.——XVI. FINE-WOOLED SHEEP.——XVII. AMERICAN MERINOS.——XVIII. THE ATWOOD AND HAMMOND MERINOS.——XIX. THE RICH MERINOS.—— XX. ABOUT SHEEP IN GENERAL.——XXI. THE AVERAGE WOOL PER SHEEP.——XXII. SUMMARY OF BRITISH BREEDS.

Long-Wooled English Sheep.

Long-wooled sheep may be divided into two classes—those reared in rich alluvial and marshy districts that have been drained, as the Lincoln and Romney marshes; and those reared in the rich agricultural districts of arable land devoted to mixed farming. The latter includes the Cotswolds, the Leicesters, and the Oxford-Downs. In discussing long-wooled sheep, we shall simply give characteristics, supplemented with accurate illustrations of the more valuable breeds, since this will be all that will be necessary to enable the reader to easily recognise them and estimate their value.

II. Lincoln Sheep.

The Lincoln sheep are the largest sheep known. Under fairly good feeding they dress up to 120 to 160 pounds at two years old past, while under exceptional circumstances they dress up to 90 pounds per quarter at that age. Their long, lustrous fleeces, at the second shearing, will weigh from 10 to 15 pounds of washed wool, the fibre measuring nine inches in length. They have been known in the United States since 1835, are hardy and prolific, but large feeders. Notwithstanding their good qualities, they have not become widely disseminated in this country, the Cotswolds being generally preferred. They require the best and most succulent grasses and the most skillful care, and this, probably, is the reason why they have not succeeded so well in the West, where high farming is not the rule.

III. Romney Marsh Sheep.

These sheep are natives of the Southeastern part of England, especially the drained marsh districts of Kent, where they have been bred from the

earliest times. They are hardier than the Lincolns, and, like most British breeds of long-wooled sheep, have been improved by a cross of the Leicester. They have a peculiar tuft of wool on the forehead; a thick, broad head and neck; are long in the body, with flat sides; a broad loin; full, broad thighs; the fore quarters are not so well developed. The limbs are strong; the hoofs broad; the wool long, somewhat coarse, but sound, bright and glossy. The wethers at three years old will dress from 100 to 120 pounds for the butcher; the ewes dress from 70 to 90 pounds, and have much inside fat. There seems to be no reason why they should not prove valuable on rich, succulent pastures in the West, though it is not to be denied that all the English breeds deteriorate in America, especially in the West, probably both from the dry climate and the want of succulent food (roots) in winter.

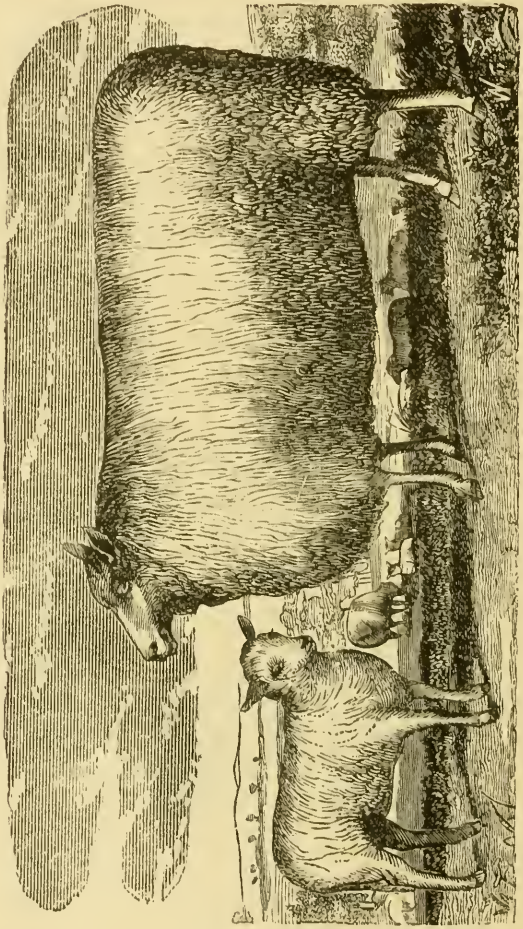
IV. Leicester Sheep.

Leicester sheep are considered as among the most valuable of British breeds, and justly so. Since their improvement by Bakewell, during the last century, they have been successfully used for the general improvement of the long-wooled breeds of England, giving better feeding quali-

LEICESTER RAM.

ties, fineness and early maturity. They are divided into Leicesters proper and Border Leicesters. The modern improved Leicester is hornless; the head small and clean; eyes bright, prominent and animated; limbs clean and fine-boned; the neck and shoulders full and deep; the body full; back straight, with hind quarters tapering to the tail, and less square than

the Cotswolds; the flesh is good, but not the best, being too fat: the ears thin, long, and directed back. The fleeces are especially valuable



LEICESTER EWES AND LAMBS.

for combing wool, being white, long and lustrous, and will average seven or eight pounds per fleece; the skin is thin, but soft and elastic. They

fatten to weigh, at twelve months old past, up to twenty-five pounds each quarter, and at two years old up to about forty pounds per quarter. The breed is popular in some parts of the United States, especially in the West, but to succeed they must have the very best of care and attention.

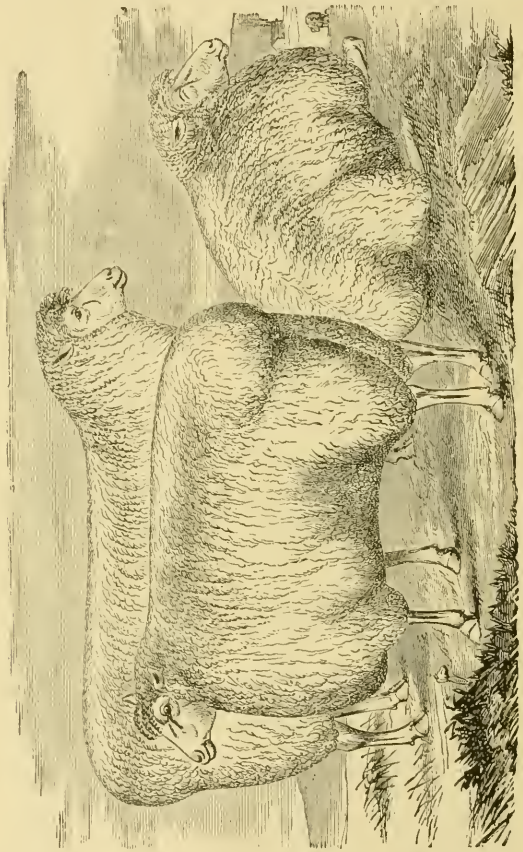
Border Leicesters.—The breeding of the New Leicesters, or Dishley as they were sometimes called, upon the "Border Sheep" of England, produced what became known as the Border Leicester, a sub-family that attained a distinct and well marked position in England, and which, under good management, at about one year and a half old, would dress from eighteen to twenty pounds per quarter of tender and succulent flesh. Older than this the accumulation of fat was great, and the meat not fine. The principal characteristics are an exceedingly small head, and small but fine bone in proportion to the weight of carcass. They have clean jaws; thin ears; full, placid eyes; straight, broad, flat back; arched ribs—a peculiarity of all Leicesters, giving the body often the appearance, when fully clothed with wool, of being broader than it is deep. The belly is, also, carried very evenly below, giving a straight or nearly straight line below. The skin is thin, but mellow, and the fleece long and soft, averaging nearly as much as the improved Leicester—six to seven pounds. Their heavy accumulation of fat has not made them favorites in the United States.

V. The Cotswolds.

There are none of the English breeds of sheep that have become so universally disseminated in the United States—not excepting the South-Downs—as have the Cotswolds. The improved Cotswold is one of the largest of English breeds, even since its refinement through the Leicester crosses. It is hardy and moderately early in maturing; strong in constitution; broad-chested; round-barreled; straight-backed; and fattens kindly at thirteen to fifteen months old to yield fifteen pounds of mutton per quarter, and at two years old, from twenty to thirty pounds per quarter. The wool of the Cotswold is strong and rather coarse, but white and mellow, six to eight inches in length, and averaging seven to eight pounds per fleece; some American fleeces have been sheared weighing eighteen pounds. The two illustrations of Cotswold ewes will show the appearance of this favorite long-wooled breed as they appear under good keeping, before shearing time.

Cotswolds in the West and South.—Their many good qualities, especially their hardiness, adaptation to the rolling prairies of the West and the hill regions of the South, have made them general favorites with long-wool breeders. They also cross kindly with other breeds, including the South-Downs; the ewes are prolific, and the flesh of the lambs and

yearlings most excellent. Like all the long-wooled breeds, they accumulate much fat with age. Another point in their favor is that the fleeces are not gummy, and do not shrink, as do the Merinos. A pound of Cotswold wool, as it is taken from the sheep, will produce as much clean

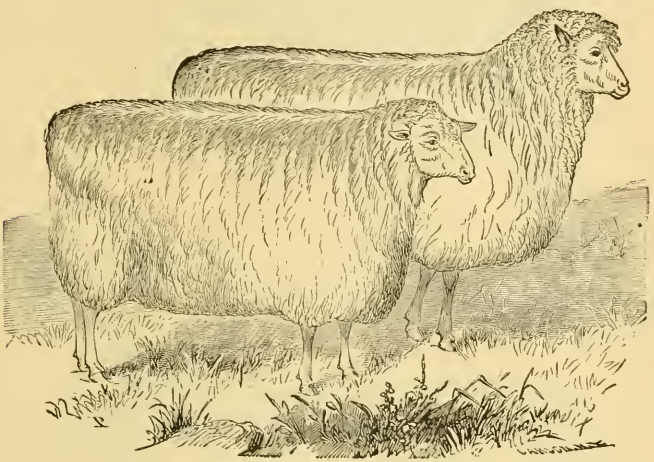


GROUP OF COTSWOLD EWES.

scoured wool as two and a half pounds of gummy Merino wool. South of the Ohio river, Cotswolds are often reported as wintering with little or no feeding, except grazing, unless during more than ordinarily severe winters. East and West of the Mississippi, in the latitude of St. Louis

and south of it, the same is true, and the statement will hold good with all the more hardy breeds. Yet, even in these genial climates, all sheep must be sheltered from storms, and it is by no means good policy to allow them to shift entirely for themselves in the matter of food. To show accurately the form of this admirable breed, we give an illustration of a ewe, and also of a buck, showing their appearance after shearing.

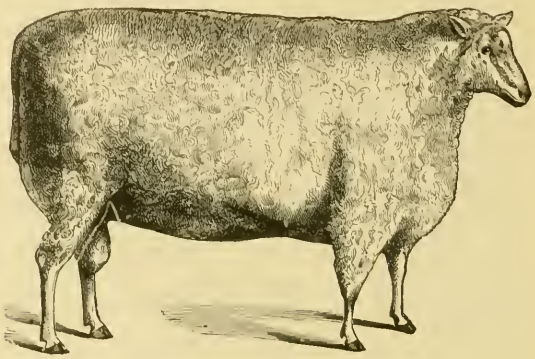
In the hill region of Virginia, and other parts of the South and West, the Cotswolds are yearly increasing in favor. The testimony of many Southern planters and farmers is decidedly in their favor. One statement,



COTSWOLD EWES.

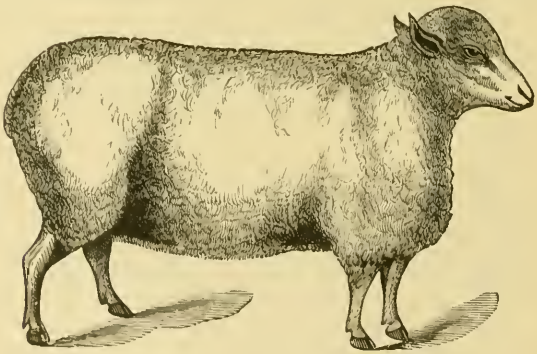
that of a prominent farmer of Clark county, Va., must suffice. His testimony is as follows: It is far more profitable to keep the different varieties of mutton breeds, than the fine wools, or Merino breed in this portion of Virginia. I say this from my own experience, and that of many intelligent gentlemen with whom I have conversed. The Cotswold sheep, and its crosses with the South-Down, are less liable to diseases of all kinds; they are more prolific, better nurses, and less liable to lose their lambs than the Merino. The lambs are more vigorous and hardy; then add their early maturity, their fitness for market at eighteen months old, and their almost double value when in market, and you have advantages which far outweigh the additional amount of food which the mutton sheep may consume in proportion to his size.

This is high praise not only for the Cotswolds, but for the South-Downs which were always a favorite breed in the hill region of the



SHEARED COTSWOLD RAM.

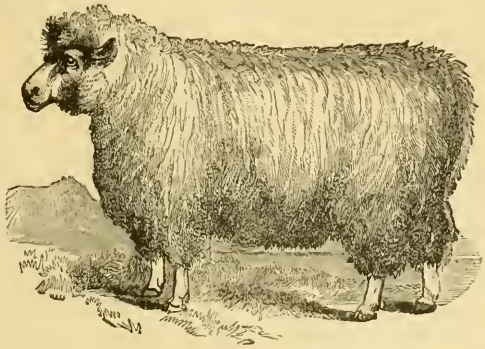
South. It must be remembered, however, that none of the long-wooled or the mutton breeds do well in large flocks. As before stated, 100 of these



SHEARED COTSWOLD EWE.

sheep is the largest number that should be flocked together. The illustration of yearling Cotswold will serve as a good representation of the

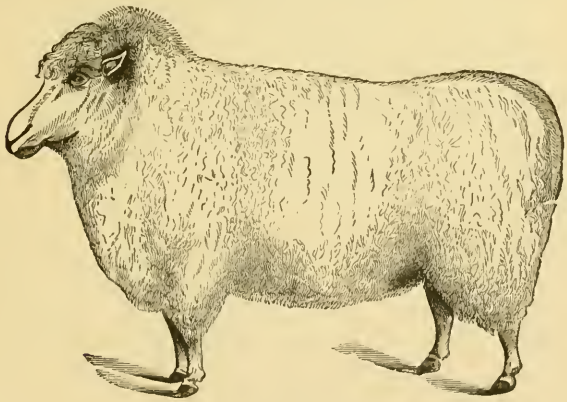
fully wooled animal at this age. It also shows the fore-top of wool on the pate, which is characteristic of this breed.



YEARLING COTSWOLD.

VI. New Oxfordshire Sheep.

Another breed that has been introduced into the United States, but has not met with general favor, is the New Oxfordshire, one of the breeds



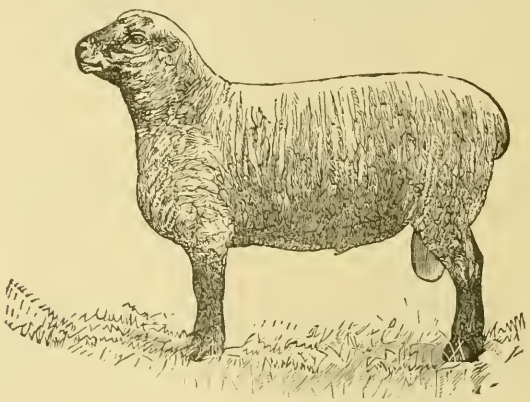
NEW OXFORDSHIRE EWE.

arising from crosses of the New Leicester upon the Cotswold. They should not be confounded with the Oxford-Down, which is a cross between

the Cotswold and Hampshire-Down, and belongs to the middle-wools, as well as to the special mutton breeds. In England they are regarded in their own locality with favor. They are less hardy than the Cotswolds, and in the United States have not been received with special favor. The illustration of New-Oxfordshire ewe will show the general appearance of the breed.

VII. The Oxford-Downs.

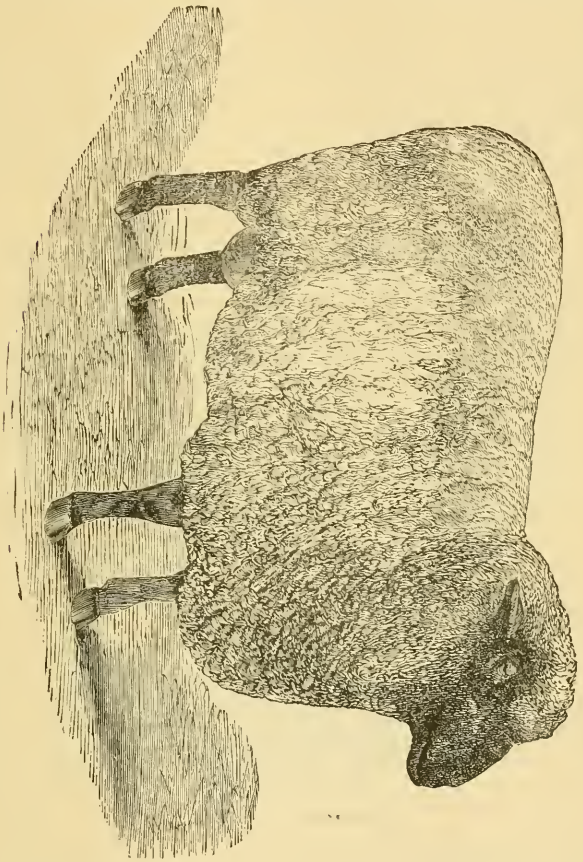
This excellent breed of English sheep is said to have originated about the year 1830, by crossing a Cotswold ram on a Hampshire-Down ewe, producing a sheep heavier than the Hampshire, resembling the Cotswold in size and fleece, but finer and firmer in the fibre. The produce of these parents were bred together, and careful selection produced sheep that in



YEARLING OXFORD-DOWN.

1862 were awarded a separate class at the English fairs. They are comparatively rare in the United States. It is said of them that, in a district at the foot of the Cotswold hills, abounding in springy places, and requiring extensive drainage, they have succeeded and thriven where neither the Cotswolds nor the South-Downs would. A pen of these sheep, shown at the Smithfield cattle show, in 1873, are reported to have averaged, at 22 months old, 298 pounds each, or 885 pounds for the pen of three. The average fleece is given as weighing 8 or 9 pounds, and of the best quality for worsted manufactures; and rams are reported as having sheared 20 pounds of wool. The ewes are prolific, producing 150 lambs to the 100 ewes. The Oxford-Downs mature early, dressing 80

to 90 pounds of superior mutton at fourteen month of age. They are hardy, herd well, and are good feeders. They have a head much like the Cotswold, with the tuft on the forehead, but with dark grey face and



OXFORD-DOWN RAM.

legs, like the Hampshires, but the grey is lighter than that of the South-Downs. The fleece is thick and somewhat curled, giving 8 to 10 pounds each, yearly, for the ewes, and twelve to fifteen pounds for the rams. The wool is six to seven inches long, lustrous, neither hairy nor harsh,

but even in quality. This breed has as yet been but sparsely introduced into the United States, but wherever it has fallen into good hands, has been much liked, and is fully worthy of more extended trial, especially on soft and spongy lands, where its constitutional vigor should stand it in good stead.

VIII. Middle and Short-wooled British Sheep.

The middle and short-wooled sheep of Great Britain are comprised principally in the following breeds: The Black-faced and the White-faced Highland sheep; the Hampshire-Downs; the Oxford-Downs; the Shropshire-Downs; the Cheviots; the Dorsets; the Welsh Mountain sheep, and the mixed Mountain sheep of Ireland.

IX. White-faced Mountain Sheep.

Wales has long been noted for one of the indigenous breeds of British sheep, as it also has been as possessing one of the indigenous breeds of British cattle. This breed seems clearly allied to the Highland sheep of Scotland, and long occupied much of the low lands and hill region adjoining Wales. Its principal recommendation is the superior quality of the

WHITE-FACED HIGHLAND SHEEP.

mutton, which, however, seldom weighs more than eight to ten pounds per quarter. These sheep are hardy, good nurses, with faces white, rusty-brown, or speckled with grey. The fleeces weigh only about two pounds each, but the wool is famous for its quality of not shrinking in washing, a quality probably due, mainly, to the fact of its being home-

spun, since the same quality is allowed to all home-spun flannel in a greater or less degree

X. Black-faced Highland or Scotch Sheep.

This breed is celebrated for its great hardiness and for its power of withstanding cold and living on scanty food even when the ground is covered with snow, as well as for its superior mutton. It is the oldest breed known in Scotland. The face is black; the muzzle thick; the horns of the rams massive and spirally curved, eyes bright and wild; the body square and compact. They herd well together, are docile and easily

BLACK-FACED HIGHLAND SHEEP.

handled. When fat, the carcass will weigh from sixty to seventy pounds, and yields mutton of exceedingly fine flavor. The ewes are excellent and careful mothers, and for these reasons we have given them a place in this work; in some mountain regions of America, this and the Welsh Mountain breed may come to be of value. The fleece of the White-faced breed will weigh about three pounds, but is adapted only to the manufacture of coarser fabrics, as carpets, blankets and rugs.

XI. Hampshire-Downs.

The Hampshire-Downs are a mixed breed, originating by crossing the South-Down on the native breed of Hampshire, followed later by the Cotswold. During this infusion of improved blood, they have retained their original hardy constitutions in a remarkable degree. Before the war they were much esteemed in the South, as being larger and fully as

good in their mutton as the South-Downs. The lambs at a year old, under good keep, will weigh 100 pounds each, and the fleeces give six to seven pounds of excellent combing wool. The mutton is not overloaded

HAMPSHIRE-DOWN.

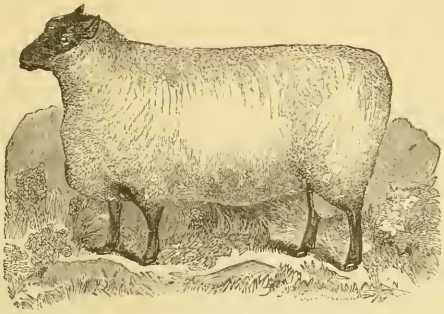
with fat, and is juicy and excellent in flavor. The Hampshire-Downs are a horuless breed with black face; roman nose; large head; the whole frame massive and compact; the barrel round and the limbs strong and short.

XII. Shropshire-Downs.

The original of the Shropshire-Downs is an old English breed which were kept on what was known as Marfe common, a tract of some 600,000 acres. They were horned; black or brown faced; hardy, and constitutionally excellent; yielding a medium fine fleece, of about two pounds weight; and about fifty pounds of excellent mutton when mature. Crossed with the Cotswold in the latter part of the last century, and later with the Leicester and South-Down, careful selection has produced a sheep without horns: faces and legs of a peculiar spotted gray or darker color: small, firm head; handsome ears; thick but handsome neck; broad deep breast—a round-barreled, broad-backed, fine-horned sheep, that at two years old, will dress 100 pounds, and under extra feed 120 pounds, of excellent mutton. The fleece is long, glossy and will yield about seven pounds of washed wool. The ewes are prolific and good mothers, and wherever known in the United States and Canada, are highly prized.

XIII. South-Downs.

The South-Downs, once the most celebrated of the mutton breeds, both in England and the United States, ought probably still to be the favorites wherever the production of mutton is the chief aim of the breeder. But in the United States, wool is the most valuable product of sheep husbandry, and in England the South-Downs have, of late years, given place in many districts to the breeds heretofore mentioned, which combine good mutton with superior wool. This is very generally the case in the United States, and especially in the West, except in the vicinity of large cities where superior mutton commands high prices. Still, the South-Downs have been bred for many years in the United States, and are found in all sections of the country. The ewes are very



SOUTH-DOWN RAM.

prolific. The staple of the wool is fine and curled, with spiral ends, well adapted to carding. They are models of what a mutton and hill sheep should be; in shape and character they have altered very much from the old-time South-Downs, being smaller in the bone, equally hardy, and with a greater disposition to fatten is combined a heavier carcass when fat. The head of the modern South-Down should be of a medium length, and the lips thin; the under-jaw, or chap, fine and thin; the ears tolerably wide apart, well covered with wool, full and thin; the forehead well covered with wool, especially between the ears, and the eye full and bright, but not prominent.

The neck should be of proportionate length, thin next the head, and enlarging towards the shoulders, where it should be broad and straight on the top, and not what is generally called ewe-necked. The breast should be wide and deep, projecting well forward between the fore-legs. This is considered an essential point with graziers, as the breast gives the sheep a greater degree of weight, and also indicates a good constitution and disposition to thrive.

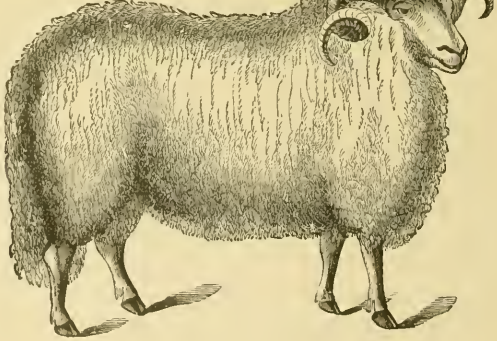
The shoulders should be on a level with the back, and not too wide above. If the shoulder-plates are very wide on the top, it is generally found that the animal drops behind them. The back should be flat, from the shoulders to the setting on of the tail. The ribs should project horizontally from the spine, extending far backward, and the last rib projecting more than the others. The rump should be long and broad, the tail set on high, and nearly on a level with the spine; the hips wide, and the space between them and the last rib on either side as narrow as possible, thus preventing the dropping of the belly; the ribs generally presenting a circular form. The legs should be of proportionate length; the hind legs full in the inside at the point called the twist; the hock, or hough, rather turning out. The fore-legs should be straight from the breast to the foot; the face and legs of a dark brown color.

XIV. Other Breeds of Great Britain.

The breeds of sheep in Great Britain are as varied as the neighborhoods, very few of them, except those already mentioned, having more than a local reputation. In the summary of breeds, a few pages further on, these will be mentioned in connection with some of those described in the preceding pages. The only additional English breed necessary to illustrate here is the Dorset sheep.

XV. Dorset Sheep.

The Dorset sheep, while probably of the same origin as the Welsh Mountain, and the Scotch Highland sheep, are peculiar, we believe, to



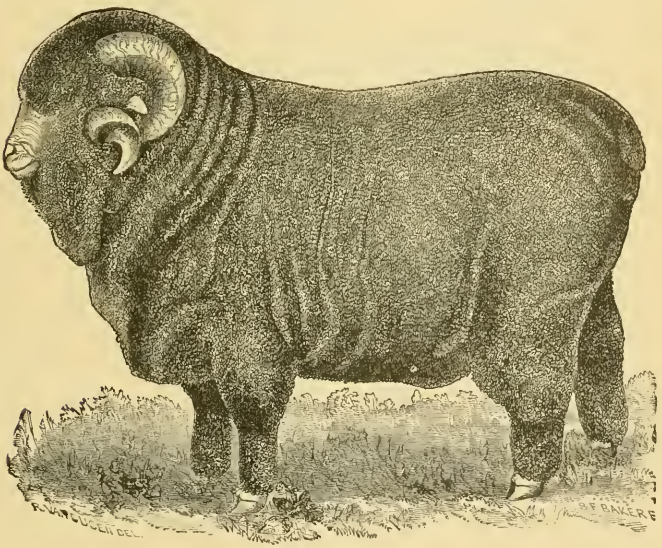
DORSET RAM.

Dorsetshire. They are a hardy, active, strong, heavily horned race, that would seem to be well able to take care of themselves in inhospitable

regions. They are larger in every way than the Highlanders, prolific, and both rams and ewes are horned. They are said to produce young twice in the season, and this is turned to account, since the mutton of the lambs is excellent, and sells for good prices. At two years old, they are said to dress 100 pounds each, and the fleeces are close, soft and white, and comb well, and weigh about six pounds each. It is probable that they might have some value in the mountain regions, where the lambs might be made available in some near market.

XVI. Fine Wooled Sheep.

The principal breeds of fine wooled sheep that have attained a good reputation, are: The Spanish, the Saxony, the Silesian, the French Merinos, and the American Merinos. This latter breed, years since famous all over the United States, is the result of careful breeding from Span-



MERINO RAM.

ish stock. All the other breeds have been carefully tried in the United States but not with satisfaction. Both the Saxony and the Silesians have exceedingly fine wool. In Australia many of the flocks have received an infusion of Saxon blood; but at the Centennial Exhibition at Philadelphia, there was nothing in the vast variety of these fleeces to induce

American breeders to make a change in their own fine-wooled sheep. A cross of the French Mernno on American Merinos, and a second cross, making the strain three quarters American and one quarter French, resulted in increased size, but the animals were tender and bad feeders. This might have been expected, since the French Merinos are at best a mongrel race. It is doubtful if now a flock of French Merinos can be found in the United States.

XVII. American Merinos.

So widely disseminated are this most valuable breed in every portion of the United States, and so well known are they, that it is not necessary to go into a description of their origin further than what has been given.

GROUP OF AMERICAN MERINOS.

Suffice it to say they are now divided into three families, known as the Atwood, the Rich, and the Hammond Merinos, from the names of the three original breeders of these strains. They have been improved by long continued and careful selections.

XVIII. The Atwood and Hammond Merinos.

The Atwood Merinos were originated in 1813 by Mr. Atwood, from what were known as the Humphrey stock. About 1844 Mr. Hammond, from selections from the Atwood flock, produced the larger breed of American Merinos, perfect in the length and thickness of fleece and thickness of staple, and characterized by great looseness of the skin which lies in soft, low, rounded ridges over the body, but offering no obstruction to the shears. These were originally of Infantado and Paular blood, the Paulars, it is said, prevailing.

XIX. The Rich Merinos.

These were originally descended from the pure Paulars of Spain, and by careful breeding and selection were much improved by Mr. Silas Rich, of Vermont, and by his son. Thus the American Merinos originated from the choicest families from the herds of Spanish grandees, at the time of their confiscation and sale by the Spanish government, about 1809. Hon. Wm. Jarvis, at that time United States Consul at Lisbon, bought 3,500 sheep from the flocks of the Paulars, Negrettis, Agueirres and Montarcos. The flocks of these grandees are said to have amounted to an aggregate of 50,000 sheep. The animals bought by Mr. Jarvis were the cream of Spanish flocks, and with the Infantados, make up the five families which constitute the ground-work of the American Merinos, now acknowledged to be the most valuable fine-wooled sheep in the world.

Thus we possess the descendants of the Infantados, large, compact, rather long bodied, and the descendants of the Paulars, smaller but exceedingly rich in all that constitutes fine wool—two well marked families that would be injured by the infusion of foreign blood, from whatever source it might come.

XX. About Sheep In General.

In Great Britain the breeding and feeding of sheep has been second in importance only to that of cattle. Since the settlement of Australia and the other British dependencies, the breeding of fine-wooled sheep in England has been almost entirely abandoned, and long, medium and short-wooled sheep—valuable as well for mutton as for their fleeces—have taken their place, leaving to the United States, and to the British colonies, the almost exclusive breeding of fine-wooled sheep—Saxony, Silesian, and French and Spanish Merinos. This production has grown into great magnitude, owing to the fact before stated, that these Merinos may be kept in immense flocks, and to the added reason, that, in Australasia and in Texas, New Mexico, and the great American plains east of the Rocky mountains, there are vast ranges of country where stock of all kinds may be herded at a minimum cost.

The sheep of the world are estimated at 600,000,000 head, yielding 2,000,000,000 pounds of wool annually. Of this number Great Britain has 35,000,000 sheep, shearing annually 218,000,000 pounds of wool. This wool is principally of long, middle and short staple, but is not what is known as fine wool. The rough wool, medium fine to coarse, but not uniform in its texture, is produced in South America and Mexico from 58,000,000 sheep, yielding annually 174,000,000 pounds of wool; in North Africa, with 20,000,000 sheep yielding 45,000,000 pounds; and

in Asia with 175,000,000 sheep, yielding annually 350,000,000 pounds of wool. Now if we add 25,000,000 sheep to these numbers for the mountain regions and northern portions of Europe, Greece, and Turkey, and 50,000,000 for Russia, producing in all 164,000,000 pounds of wool, the entire balance of the world may be set down as the home of fine-wooled sheep. Of these Australia has 60,000,000; the United States 36,000,000; the Cape of Good Hope 12,000,000; Germany 29,000,000; Austro-Hungary 21,000,000; France 26,000,000; Spain 22,000,000; Italy 11,000,000; Portugal 2,750,000 sheep. Of all these countries, Australia produces the finest wool, while the United States and Canada come next, although Canada is essentially a mutton producing country, which the United States is not, for the number of sheep kept.

Notwithstanding the immense area in the United States adapted to sheep husbandry, the industry has not kept pace with the demand, and until ten years ago our wool imports were constantly on the increase in spite of the yearly increase of our flocks. From 1870 to 1875, only two-thirds of our manufactured wool product was home grown. Since that time our annual imports have not increased. The bulk of imported wool is of low grade carpet wools, and unwashed Merino, and constituting only one-fourth of the product manufactured.

XXI. The Average Wool per Sheep.

In the United States the average weight of wool per fleece is over five pounds; in Australia it is over four pounds; in Great Britian four and three-quarters pounds; in the German Empire three and two-thirds pounds; in France four and five-sixths pounds; in Austro-Hungary three pounds. South American fleeces are variable in weight, but much lighter than those of Australia, and probably will not average more than three pounds of wool each.

XXII. Summary of British Breeds.

The report to the Government of the United States, following the Vienna Exhibition, states the characteristics of prominent English breeds as follows: The British breeds are most naturally divided according to altitudes and fertility of their habitat. The large breeds, white, hornless, and bearing long wool with small felting property, occupy the rich alluvial districts, the lands reclaimed from the sea, and the highly cultivated and very productive farm-areas. These are the Leicester, Lincoln, Romney-Marsh, Cotswold, the few remaining of the Devonshire Notts, the Roscommon, and similar Irish sheep. Next should be classed the sheep of the chalk-downs, the commons and forests, suited to a dry and temperate climate. These are the Downs of several families, perhaps now to

be taken as breeds, the Dorsets and their congeners—the pink-nosed Somersets. They produce a short, felting-wool, suited to inferior grades of goods. The Ryeland, formerly found in the western counties, and esteemed for producing the finest cloth-wool of England, is now almost extinct. The third general division comprises the mountain breeds, first the Cheviots of the hills of the North of England and borders of Scotland; the Black-face of the central chain of mountains and moors northward from Derbyshire to the mountains of Scotland; and two varieties of Welsh mountain-sheep, and the Kerry and other mountain breeds of Ireland. There are many local remnants of the ancient stock allied to the above, but there are none worthy of special mention. The weight of fleece of British sheep averages about five pounds. The Lincolns may be placed at eight pounds, the Cotswolds nearly the same, the Leicesters at seven, the Downs at four, the Cheviots at three, the Black-faces at two and one-half, and the Welsh at two. The Leicesters are most numerous, exceeding one-third of all; the Downs one-sixth, the Black-faces nearly as many, Cheviots one-eighth, leaving about one-fifth for other breeds. The heavy breeds of eighty years ago, modified mainly by the Leicester, now furnish lighter fleeces.

CHAPTER III.

BREEDING AND CARE OF SHEEP.

1. CONSTANT WATCHFULNESS NECESSARY.——II. THE BREEDING AGE OF SHEEP.——III. CROSSING.——IV. COUPLING.——V. THE PROPER TIME FOR COUPLING.——VI. GESTATION.——VII. KEEP A RECORD OF THE BREEDING.——VIII. MANAGEMENT AND TRAINING OF RAMS.——IX. PASTURAGE FOR SHEEP.——X. WATER.——XI. PROTECTION FROM INSECTS.——XII. EARLY AND LATE PASTURE AND FEEDING.——XIII. WINTER FEEDING.——XIV. SHEEP BARNS.——XV. GRADING THE SHEEP.——XVI. FEDING TROUGHS AND RACKS.——XVII. CASTRATION AND DOCKING.——XVIII. WEANING THE LAMBS.——XIX. LAMBING TIME.——XX. THE NURSERY.——XXI. TAGGING SHEEP.——XXII. WASHING AND SHEARING.——XXIII. TYING THE WOOL.——XXIV. DIPPING AND ANOINTING SHEEP.——XXV. A WORD ABOUT GOATS.

I. Constant Watchfulness Necessary.

Constant care and attention are necessary in the management of sheep. They are timid, without self-reliance, a prey to dogs; and even foxes will destroy the lambs. The necessity of keeping large flocks together causes them to be especially liable to contagious and epidemic diseases. In any district where many sheep are kept, wandering curs must be destroyed. They are worse than wolves and foxes; for the latter may be guarded against at night, while dogs scare and destroy sheep in the day time as well. Care must, also, be taken to secure them against contagious and epidemic diseases. The shepherd must be watchful, vigilant and attentive, summer and winter; it is worth his while to be so, for there is money in sheep, once in the fleece and once in the carcass.

II. The Breeding Age of Sheep.

The proper age for sheep to breed is two years. The ewe may be placed with the buck in the autumn after she is one year old, and thereafter she may continue to breed until the age of ten years. But unless there is something in a buck or ewe more than ordinarily valuable, it is hardly economy to continue them breeding beyond seven or eight years old. From the age of three to eight years the best lambs will be produced. Under exceptional circumstances a strong ram will cover 100 ewes if allowed only one service each; but as a rule it is better to keep a ram for each fifty ewes.

III. Crossing.

Unless the breeder be thoroughly informed, and is breeding with a view to the establishment of a new breed, in which distinct characteristics are to be perpetuated, nothing is gained by crossing two distinct breeds. The breeding of grades is different. If the farmer cannot afford to breed pure stock, the American Merino may be crossed upon any of the ordinary fine-wooled sheep of a district. In like manner the Downs will improve the quality of the mutton and wool; the Leicester will give increased size and early maturity, and length of the wool staple; so will the Cotswold, and the latter will certainly get good constitutioned sheep. The breeding of Merinos upon long-wooled sheep should never be thought of.

IV. Coupling.

In breeding in flock, when more than one ram is kept, select the ewes most fitted to each ram. At the coupling season, drive a flock to the yard and let the proper ram in to them; never allow more than one service, and, as soon as performed, separate the ewe, and so proceed until all the ewes in proper condition are served. Never allow a teaser, that is, an aproned ram, to run with the flock. Make a record of the ewes served, and if from the fourteenth to the seventeenth day they do not again come into heat, they may be considered to be with lamb; but to make sure, they may be returned to the ram upon the thirteenth day after service.

V. The Proper Time for Coupling.

November is the season for coupling; but if the object be to raise the sheep for mutton and wool, the lambs should not be dropped until after the time of grass, unless a place artificially warmed be provided for weaning. If the object be to sell young lambs, the earlier in the season they are produced the more money they will bring.

VI. Gestation.

Ewes carry their young on an average of 152 days from the time of successful service. Twenty-two weeks is usually allowed, but the time may vary a week or ten days either way; 146 days is the shortest period and 161 days the longest.

VII. Keep a Record of Breeding.

There is nothing more important in breeding animals—especially pure-bred animals and grades—than to keep a careful record of the breeding. If you buy or breed an animal intended for breeding, enter its age and pedigree, unless the entry is already made in a public record (herd book),

in which case refer to it by page and number. Write down, also, every trait and characteristic, even to the minutest, including feeding and thriving qualities; it will save you much care and vexation in future. If you are breeding sheep, preserve samples of the wool from year to year, and attach to the samples a record of weights, with comparison of quality from year to year, and one fleece with another. Thus, on all occasions, you may satisfy not only yourself, but any buyer as to the quality of your herd. Even with ordinary flocks, a carefully kept register of name, age, characteristics, and quality will be found useful.

VIII. Management and Training of Rams.

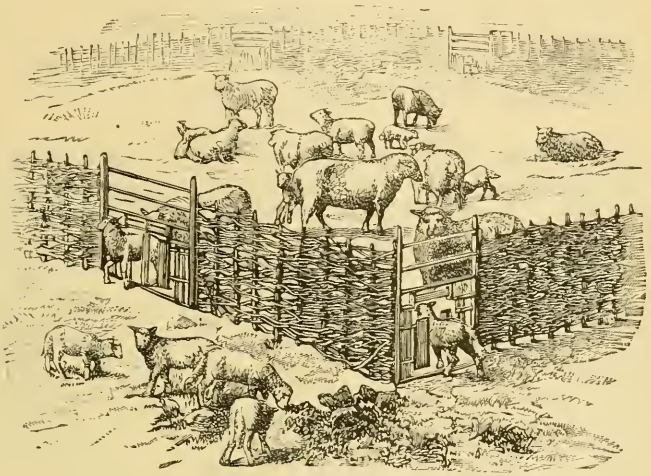
Rams should be trained to docility and obedience, and this is not difficult to do. They should never be allowed to run with the flock of ewes, but should have separate pastures and enclosures, clean and comfortable, and entirely disconnected from the flocks. They should be trained to lead and to be handled; and if more than twenty ewes are to be served during the season, the ram should have extra feed and care for at least six weeks before tupping time. One hundred and fifty ewes have been served by a single ram during an extended season, but under the best of keeping less than 100 is better than over that number. Do not let a ram serve more than two or three ewes in the beginning of the season, increasing the number to five, and even ten, if necessity demands. As the season approaches the close, restrict him again to a small number, for an exhausted male cannot get strong progeny. To keep the reproductive powers in full vigor, daily exercise must be kept up. There is more in this than many persons imagine.

IX. Pasturage for Sheep.

Sheep eat a variety of vegetation other than the true grasses. They are fond of many weeds, and if allowed they will soon reduce the weeds that spring up after harvest. All the pasture grasses are natural to sheep, except those, like Timothy, which close feeding is apt to kill. Blue grass, orchard grass, the fescues, red-top, rye grass, etc., may be the main dependence for sheep; clovers they do not like so well. In pasturing ewes with lambs it is well to have spaces through which the lambs can pass, and yet which will not permit the egress of the ewes. In England these are called lamb creeps; this arrangement, as shown in the illustration, often enables the lambs to get much succulent food outside, and they do no damage to crops. In fact, sheep are often turned into corn-fields, and other hoed crops, late in the season, to eat the weeds, of which they are fond. They will soon clean a crop if it be such as they will not damage.

X. Water.

It has been said that sheep require no water when pasturing. Do not listen to such folly. On very succulent grass they will live without it, and as a rule, take but little. They should always have it to take when



ENGLISH LAMB CREEPS.

they desire. Like any other animal, sometimes their systems requires more than at others. This is especially true during suckling time. See that they have it, and of pure quality. Sheep, above all other animals, should never drink from stagnant pools.

XI. Protection from Insects.

In summer, sheep should have shelter where they may escape from the many insects that torment them, especially the sheep gad-fly, and others producing internal parasites; also, during July and August, provide a plowed surface of mellow soil, and smear their noses, if necessary, daily with tar.

XII. Early and Late Pasture and Feeding.

The better your early and late pastures are, the easier you can winter your sheep, especially in the West where few roots are raised. Attend to this, and supplement the pastures by sowing rye and other hardy cereal grains, which may be done on corn land of the same season, at the last

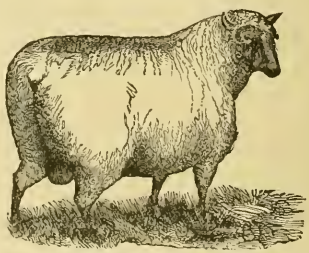
plowing, and upon grain land intended for hoed crops next season. Light grain, of little other value, will prove a mine of wealth in this way if sown as directed.

Never allow your sheep to fall away in flesh before they are put into the feeding yards and barns for the winter. The time to feed is before they begin to lose flesh. They will, indeed, shrink in weight somewhat, as the feed becomes dry, but it will be principally moisture that they lose, if proper feeding be kept up. When the full succulence of the flesh is to be kept up, there is nothing better than roots—Swedish turnips, carrots and beets being the most profitable in the West. At all events, as the pastures become dry, let the sheep have one feed a day of something better than they can pick up in the fields.

XIII. Winter Feeding.

You cannot have an even texture of wool, if sheep are allowed to fall away greatly in flesh, or even receive a decided check. Every time this occurs, a weak place will be found in the wool. Nor can you raise heavy fleeces on hay. If you do not intend to take the best of care of sheep, and keep them thriving, you had better not keep any but the commonest kinds. It is true, you will lose money on these, but then you will have the satisfaction of knowing that you have lost less money than you would have lost on better ones.

ALLOWED TO SHIFT FOR ITSELF.



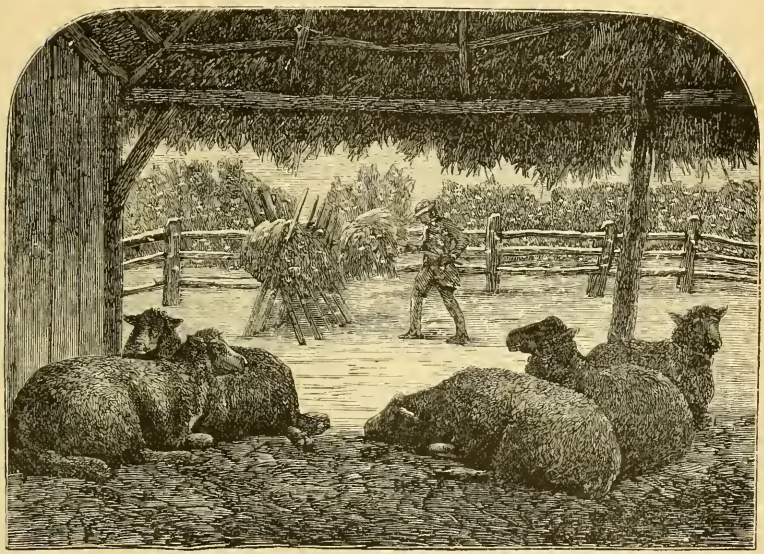
WINTERED WITH GOOD SHELTER AND FEED.

The feeding of roots is essential to the best care of sheep, especially when the succulence of the flesh is to be retained; but roots are not absolutely necessary. The question of cost must be considered in connection with grain. Carrots and parsnips may be raised with proper implements and put in pits for five dollars per ton; and Swedish turnips and mangel wurzels, for about three dollars or less. Carrots are excellent for ewes before lambing time, and parsnips for those giving milk; the latter may be left all winter in the ground and be fed up to the time grass becomes flush. Beets should not be fed until after January on account of

an acrid principle they contain when first pitted. They are best when used after the Swedes are exhausted.

XIV. Sheep Barns.

These need not be expensive structures, since it is only necessary to provide shelter that will keep out wind and water, and at the same time admit of proper ventilation. Ventilators for the escape of foul air must be provided at the peak of the roof, and sliding doors and windows are needed to allow the ingress of air, according to the wind and temperature.



SIMPLE SHELTER, BUT GOOD CARE.

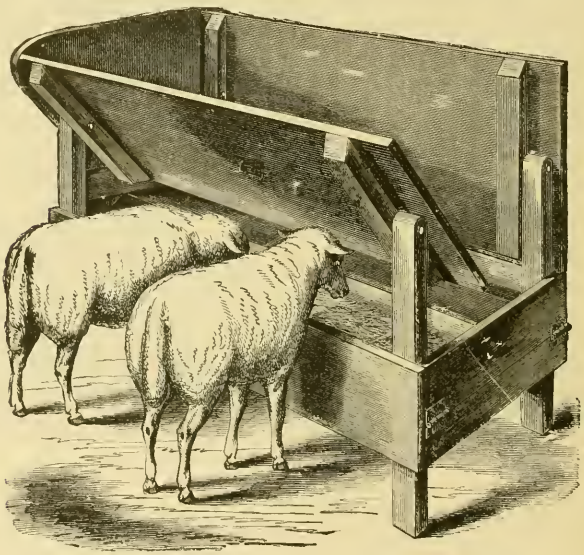
Let there be a passage-way through the center, if many sheep be kept, wide enough to admit a wagon—say nine feet—for ease in feeding and cleaning. On each side of this passage should be the racks and troughs for feeding, the pens being arranged so as to accomodate about twenty-five sheep each. In very severe weather this passage may be used for sheltering sheep kept in open sheds, if necessary. The illustration shows one of the simplest forms of shelter, a structure of poles covered with hay.

XV. Grading the Sheep.

Sheep in winter should be carefully graded, according to size, strength and condition. Strong lambs should not be put with weak ones; the same rule applies with ewes and wethers. Rams should never be kept with any other sheep; nor should ewes be kept with wethers. Fattening sheep will, of course, always be kept by themselves. The larger the flock the more closely can sheep and lambs be graded, according to age, size, strength and other conditions.

XVI. Feeding Troughs and Racks.

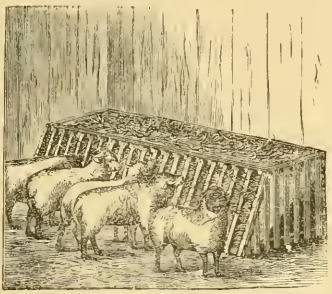
Sheep should never be fed on the ground, but from suitable troughs and racks. The arrangement of these will depend upon whether the sheep are to be fed under shelter or not. The racks should be low enough for the



COMBINATION TROUGH.

sheep readily to get the fodder without reaching too high, and below should be a receptacle for catching the waste. The illustration given shows a good form of feeding trough; if intended for hay, let the slanting board be of slats, or it may economically be made double, so as to

allow feeding on both sides. Again, it may be used alternately for both hay and grain; the hinged doors allow easy cleaning. The back is up-



IMPROVED SHEEP RACK FOR PREVENTING WASTE.

right; the center boards are movable to work up or down, so that when feeding from both sides they rest together on the center beam.

XVI. Castration and Docking.

Lambs should be castrated at from two to four days old. A lamb is held by an assistant, who turns him upon his back, holding the rump between the knees—the head towards himself—taking the fore and hind legs in each hand, putting the fore legs outside of the hind, and holding them firmly just above the knee joints. The operator takes hold of the pouch and pulls it gently, so as to get as much as possible of it, and then with a sharp knife at a single stroke, or better, a pair of strong shears, takes off the pouch pretty close to the testicle. Then take a firm hold of each testicle separately between the fore finger and thumb of the right hand, and pull it out with all the cord that adheres to it. This completes the operation. The reason for cutting off all the pouch that can be easily pulled beyond the testicle is, that it leaves a much evener surface for shearing than if only a little is taken off. This operation should be performed in the morning, and the lambs then turned out to move about, which will, in a great measure, prevent any disposition to swelling or stiffening of the parts, which is frequently the case if they are allowed to lie still for a time afterward.

Docking should be performed as soon as they recover from the gelding, generally about three days afterward. This operation should be performed with a single stroke of a sharp knife, and in the evening, being careful to sever the tail at a joint, the assistant drawing the skin of the tail to the body, so that the end will well cover the stub. Then allow

the flock to lie down and keep quiet and still, so that they may lose the least possible amount of blood. By morning the wound will be sufficiently dried that no fear of bleeding need be entertained, unless by accident. In no case should they be driven or put to any extra exertion immediately after being docked, for sometimes they will bleed to death. If much bleeding ensues, touch the part lightly with a red-hot iron.

XVIII. Weaning the Lambs.

Spring lambs should be weaned only in the fall, so the dams may have the advantage of grass to recuperate before winter. Lambs, in fact, should do well enough if weaned at three months old, and four months' suckling is ample; nothing is gained by allowing them to run longer with the dams. When once taken away, they should be placed entirely out of sight and hearing of the dams, and if several are together they will sooner become contented.

XIX. Lambing Time.

Especial care must be taken of the ewes at and near lambing time. If the weather is not warm enough to fully prevent chilling, fire heat and a secure place must be provided until the lamb is dried and has taken the

CARING FOR THE LAMBS.

teat. A young lamb is the tenderest of all farm animals, and a ewe is very apt to become indifferent to a weak lamb. Hence the necessity of that constant care and watchfulness, which will suggest itself to every intelligent person.

XX. The Nursery.

Every shepherd should provide a nursery for sheep that are ailing, especially in winter. This may even be made available as a place for lambing. It is better, however, that both a lambing place and a nursery be provided, since fire is essential for new-born lambs early in the season.

XXI Tagging Sheep.

This is important and should be performed as soon in the spring as possible, certainly before the sheep are turned to grass. Secure the sheep and cut away all the wool about the buttocks liable to gather dirt and dung which accumulates in balls. It will improve the sheep and save much trouble at shearing time.

XXII. Washing and Shearing.

We do not believe in washing sheep. It is distressing and dangerous to the sheep, and the wool often becomes dirty again before shearing. But if the sheep are to be washed, it should be done in clear, running water, on a gravelly bottom, or under a stream of water. Do not shear for three days or more after washing, according to the weather. For those who still believe in washing sheep, the two illustrations will show the old and the new method, the latter being the best.

It is important that the shearing be properly done, and no unskilful person should be allowed to handle the shears. It is better to pay an extra price than to allow the skin of the sheep to be clipped and torn in shearing. If the sheep have been washed, shearing should take place when the oily-feeling matter, termed yolk, has so far reappeared in the wool as to give it its natural brilliant appearance and silky feeling. The wool should be cut off evenly and smoothly, reasonably close, but not leaving the skin naked and red, which renders the sheep very liable to receive injury from cold. Stubble shearing and trimming, leaving the wool long, so as to give the next fleece the appearance of extraordinary length, or leaving it long in places, in order to affect the apparent shape of the animal, are both frauds, but are sometimes practiced by unscrupulous persons, on sheep intended for show or for sale.

XXIII. Tying the Wool.

The fleece should be as little broken as possible in shearing. It should be gathered up carefully, placed on a smooth table, with the inside ends down, put into the exact shape in which it came from the sheep, and pressed close together. If there are dung-balls, they should be removed. Fold in each side one-quarter, next the neck and breech one-quarter, and the fleece will then be in an oblong square form, some

twenty inches wide, and twenty-five or thirty inches long. Then fold it once more lengthwise and it is ready to be rolled up and tied, or placed in the press.

XXIV. Dipping and Anointing Sheep.

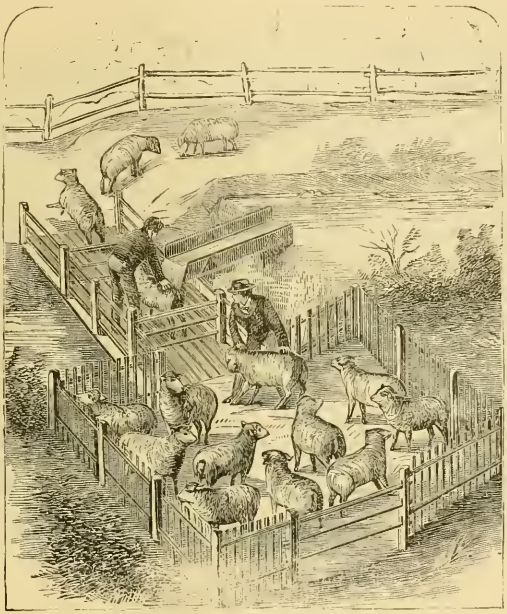
For freeing sheep of vermin, as lice and ticks, and also to free them from mange and other itch insects, recourse must be had to dipping, as it is termed. When large flocks are kept, this is the only course

OLD WAY OF WASHING SHEEP.

to pursue. When but few sheep are kept, the cure is accomplished generally by anointing them with any of the preparations in common use for this purpose. For those who prefer ointments, the following will be found good: One pound mercurial ointment, one-half pint oil of turpentine, one pound resin, and six pounds of lard. Dissolve the resin in the turpentine; dissolve the lard by gentle heat, mix the mercurial ointment thoroughly with it, and when cold rub both preparations well together. In applying this, the wool must be parted well down to the skin from between the ears to the tail. From this similar partings should be made along the shoulders and thighs to the legs and also parallel ones

along the sides. These furrows must have the ointment lightly rubbed into the skin as they are formed.

For dipping sheep, suitable yards, a dipping trough, and dripping platform must be provided; also means for heating and keeping the liquor hot. The following is one of the best mixtures, having met with favor in England, Australia and America: Three pounds arsenic, three pounds pearl ash, three pounds sulphur, three pounds soft soap. Mix in ten gallons of boiling water, stir, but avoid the fumes, and add ninety gallons



THE NEW WAY OF WASHING SHEEP.

of cold water. Prepare a tank that will easily allow a sheep to be dipped, having a slanted, slatted drain at the side, tight bottom underneath, to allow the drip to run back. Dip the sheep, back down, being careful not to allow the head to enter the poisonous mixture, letting the animal remain one minute. Lift on to the slats and rub and squeeze the wool, until pretty well drained, and place in a yard until dry. When partly dry, go over the heads with the ointment as recommended in case the flock is too small to allow the expense of preparing for dipping.

XXV. A Word About Goats.

So much has been said about the keeping of goats for their fleece, that we give a summary of the facts in the case. The substance of what follows was prepared by the writer for the American Encyclopædia of Agriculture, from which we extract:

As a food animal, neither the common goat nor its kids are much esteemed in the United States. As for their milk, we seldom see them kept, except occasionally for the use of invalids. In many countries,

ANGORA BUCK.

however, as in some mountainous sections of Europe and Asia, it is different. Large flocks are kept, not only for their milk, but for the manufacture of cheese. This is especially true of Switzerland. In Mexico and New Mexico large numbers are kept. In some portions of Texas, and in California, they are more or less found. In mountainous, barren regions where subsistence may scarcely be had for cattle, the goat may eventually find a place in the United States. Such, however, has not yet been the case with the exceptions named. Here and there goats are kept about stables for their supposed good effect on the health of the horses. Of the

other varieties of goats introduced into the United States, at different times, there has been great confusion of names. Thus, it has been said, the Cashmere, Persian, Angora, and Circassian goats are the same, only modified by altitude where raised. This is undoubtedly a mistake. The Cashmere and Thibet goats are the same, and in their native country are said to yield only about three ounces of the precious down per fleece, of which the costly Cashmere shawls are made. In France the introduction of the Cashmere goat, in 1819, did not prove profitable, the yield of

FEMALE ANGORA.

down being too small. In 1822 a cross was made between the Cashmere and Angora goat, which brought the yield of down from three ounces to thirty-three ounces per fleece. In 1849 the first introduction of Cashmere goats was made into the South. Other importations into other States have followed, notably to New York and California, especially of the Angora goat. The cuts of male and female Angoras will show their characteristics. They are now found in nearly every State in the Union, principally through their crosses on the common female goat. They are hardy even in Wisconsin, yet they have not proved profitable to their

owners, even in mountain districts, and their breeding has pretty much been abandoned, except in some portions of the South, Utah, and California.

There would seem to be no reason why the rearing of Angora goats should not be profitable in much of the hill and mountain regions of the South, and in the mountain regions of California and Oregon. Much of the hill and plain region of the far West should also be excellently adapted to this industry. That the common goat thrives and breeds with the utmost fecundity in Mexico and New Mexico is well known, and this is true of the plain regions wherever they have been tried. The Angora will thrive wherever the common goat will. The probability is that the high price of the pure stock operates against the breeding of these animals; and besides little is really known of them outside the fine breeders who are interested in them. Capital is cautious about entering into untried channels; this is especially true of agricultural capital. Farmers, as a class, are conservative in their ideas, and properly so, since their wealth is, as a rule, accumulated slowly. Probably the time has not come for the development of this industry; if it ever comes, it must arise from a steady and increasing demand for the staple, and only when these fleeced Angoras shall have proved themselves adapted to the climate, and reasonably prolific.

PART VIII.

Diseases of Sheep.

HOW TO KNOW THEM; THEIR CAUSES, PREVENTION AND CURE.

DISEASES OF SHEEP.

CHAPTER I.

GENERAL DISEASES.

I. REFERRING TO SCIENTIFIC TERMS.——II. INFLAMMATORY DISEASES.——III. DISTEMPER OR EPIZOOTIC CATARRH.——IV. GRUBS IN THE HEAD.——V. HYDATIDS ON THE BRAIN.——VI. APOPLEXY.——VII. INFLAMMATION OF THE BRAIN.——VIII. INFLAMMATION OF THE EYES.——IX. SWELLED HEAD.——X. VEGETABLE POISONING.——XI. TETANUS OR LOCK-JAW.——XII. PARALYSIS OR PALSY.——XIII. RABIES OR CANINE MADNESS.

I. Referring to Scientific Terms.

The anatomy and explanation of the terms used to designate the several parts of a sheep have been treated of in Chapter I of Part VII. A careful study of these is necessary to enable the flock-owner intelligently to undertake the cure of disease, as well as to enable him to become nicely conversant with all that goes to make up physical perfection in the animal. The knowledge of these things is an important integer in constituting the difference between haphazard and practically intelligent breeding, management, and cure of diseases, and may save the intelligent man valuable animals and much money yearly. In the United States and Canada, the fatal diseases to which sheep are subject are comparatively few; and this is especially true in the West and Southwest, owing, probably, to the fact that the summer and autumn are comparatively dry and equable, and the winters not characterized by excessive dampness.

II. Inflammatory Diseases.

Diseases of an inflammatory nature are prolific causes of death among sheep in Great Britain. In America, our sheep are comparatively exempt from these diseases. Mr. Spooner remarked this fact, in comparing English and American sheep, and attributed the cause to the more artificial care of sheep in England. Whatever the cause may have been in his day, this will not now apply; for in no country is all farm stock more highly fed than in the United States and Canada. The real cause undoubtedly lies, first, in the climate, and second, in the greater intelligence of our flock masters. They neither intrust sheep nor other farm stock

to ignorant servants, who, perhaps, can neither read nor write, and who add superstition to ignorance. The intelligence of the master keeps pace fully with all that is new in the art of farming, and this intelligence is quickly caught by the workmen and shepherds.

III. Distemper or Epizoötic Catarrh.

Sheep distemper or Malignant Epizoötic Catarrh, is an epizoöty that is sometimes fatal in sheep, both East and West. The disease in its malignant form is a severe congestion and inflammation of the lining membranes of the nasal cavities, sometimes extending to the stomach and bowels.

How to know it.—There is a slight watery discharge from the nostrils and eyes; there is depression and more or less loss of appetite; the pulse is slightly increased in frequency and is weak; the breathing is not changed unless the bronchial tubes are affected; there is no cough. At the end of a week, unless the animal gets relief, the nasal discharge is thick and glutinous, and sometimes tinged with blood; the eyes are half closed and the lids are gummed with a yellow secretion; there is great prostration and emaciation; the pulse is very weak; respiration is difficult; the appetite is lost, and the animal soon after dies.

What to do.—There should be no bleeding or purging. Remove the sheep to warm, well-ventilated quarters, and if the bowels are costive, prepare the following:

No. 1.
1 Ounce carbonate of ammonia,
1 Ounce rhubarb,
2 Ounces ginger,
2 Ounces gentian.

Simmer the rhubarb, ginger and gentian for fifteen minutes in a quart of water, and, when cold, add the ammonia and cork the bottle. Give two tablespoonfuls four times a day. Keep up the strength of the sheep with good food and nourishing drinks. Good nursing is of equal importance with the other treatment, for if the sheep are neglected they will either die or become so enfeebled as to be of little value.

IV. Grubs in the Head.

Causes.—This is caused by the eggs of the sheep gadfly (*Œstrus Ovis*,) being deposited in the nostrils of the sheep in July and August. The eggs being deposited, the maggots hatch and find their way through the sinuses, causing much pain. When the gadflies are seeking the sheep, the animals will crowd together, with their noses to the ground, stamping violently at times, and will run from one place in the pasture to another. When the maggots reach their resting place they attach themselves by their hooks, and are not easily dislodged.

SHEEP GADFLY.

GRUB OF GADFLY.

What to do.—The grubs may often be extracted by a competent surgeon, but it is a nice operation, and scarcely pays except in the case of a very valuable animal. Burning leather under the noses of the sheep in a close place, to cause violent sneezing, used to be practiced, but it is unsafe. Injecting up the nostrils equal parts of sweet oil and turpentine will often dislodge the grubs when they are not firmly fixed, but care must be taken not to strangle the sheep.

Prevention.—Prevention is in this case far the best remedy. Keep a portion of the field plowed so the soil is loose and dry. Smear the sheep's noses once a day with tar during the season of the fly, and catch as many of the flies as possible, by means of a light bag-net.

V. Hydatids on the Brain.

Causes.—The bladder worm, causing this dangerous disease, is one of the forms of the tape worm, preceding the true or sexually perfect worm. It is rare in America, probably from the fact that there are fewer dogs in proportion to the population than in England.

What to do.—Once fixed, nothing practically can be done, though, when located, surgeons have pierced the cysts with a strong hypodermic syringe, injecting therein half a teaspoonful of the following:

No. 2.
1 Grain iodine.
5 Grains iodide of potash.
1 Ounce water.
Mix.

Prevention.—Never allow dogs to feed on sheeps' heads, or other garbage, unless cooked in the most thorough manner, remove the excrements of dogs wherever found in the pastures, and kill all dogs that make a habit of prowling about, away from home.

VI. Apoplexy.

This disease is mostly confined to sheep that are plethoric and fat.

What to do.—The sheep will leap suddenly in the air, fall, and unless promptly relieved, will die in a few minutes. Then the only remedy is sudden and copious bleeding from the jugular vein.

Prevention.—Fat sheep should be carefully watched for the earlier symptoms. If a sheep appears dull and partially unconcious of what is going on; if the nostrils and pupils of the eyes are dilated, and the membranes of the nose deep red or violet: the pulse hard and the breathing stertorous, bleed immediately and give afterwards two ounces of epsom salts, to be followed by an ounce every six hours, until a full evacuation takes place from the bowels.

VII. Inflammation of the Brain.

This is produced by the same causes that produce apoplexy, and is often a secondary effect of apoplexy. The animal is dull and inactive; the eyes red and protruding, and, as the symptoms intensify, the animal rushes about in the wildest delirium. The general treatment is the same as for apoplexy.

VIII. Inflammation of the Eyes.

What to do.—If there is serious inflammation, take a little blood from the facial vein, the vein running down obliquely from the eye. Bathe the eyes with the following wash:

No. 3.
5 Grains nitrate of silver,
1 Ounce soft water,
15 Drops laudanum.

Dissolve the nitrate of silver in the water and add the laudanum; mix. Bathe the eyes well three times a day and apply the lotion twice a day with a camel's hair brush.

IX. Swelled Head.

Causes.—This is produced by a variety of causes, the bites of venomous serpents and malignant insects, etc. Snake bites usually produce death before the animal is found.

What to do.—In case of the bites of venomous insects, cut the wool from around the parts, and bathe with strong saleratus water and give internally, if necessary, each hour until relief is obtained, the following:

No. 4.
½ Drachm chloral hydrate,
1 Ounce soft water.
Mix.

X. Vegetable Poisoning.

What to do.—In case of trouble from vegetable poisoning, bathe the affected parts thoroughly with warm water, and keep moist with the following lotion:

No. 5.
1 Ounce sugar of lead.
1 Pint soft water.
Mix.

XI. Tetanus or Lock-Jaw.

Causes.—There are various causes producing this difficulty, as inflammation of the membranes after gelding, injury to the horns and hoofs, or a wound on any part of the body.

How to know it.—The animal, if able to walk at all, does so with great distress; the jaws are set, and death generally takes place quickly. It is an excited condition of the nervous system.

What to do.—Treatment is of little use, the malady being usually fatal. Put the sheep into a dark place alone, and put a piece of Solid Extract of Belladonna, the size of a pea, on the tongue twice a day; put oatmeal water in the pen for him to drink. Warmth and quiet are essential. Bleeding used to be considered a specific by many, but it should not be practiced. Move the bowels as soon as possible, and follow this up with belladonna. Give four ounces of castor oil as the laxative. When the worst symptoms are overcome, give gruels and other soft nourishing food until recovery.

XII. Paralysis or Palsy.

Lock-jaw and epilepsy are often mistaken for palsy; yet, it is the direct opposite of them. Like the two first it is somewhat rare in America.

What to do.—The first thing to do is to make the lamb warm and comfortable. Give warm gruel, with a little ginger as a stimulant. If the bowels are costive give four ounces of linseed oil. Give twenty grains of powdered Nux Vomica in soft mashes three times a day; continue this two or three weeks. If the paralysis is severe, clip off the wool and apply a blister of Spanish flies to the spine, from the points of the hips to the shoulders.

XIII. Rabies or Canine Madness.

Sheep are particularly liable to be bitten by rabid dogs in their first stages of madness. The flock-master should not hesitate to destroy all strange dogs, and, of course, the sheep if attacked with rabies must be killed at once.

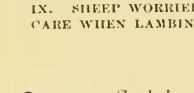
CHAPTER II.

PARASITIC AND OTHER DISEASES.

I. SCAB, TICKS AND LICE.——II. FOOT-ROT.——III. FOUL IN THE FOOT.——IV. SWOLLEN FOOT AND GRAVEL.——V. MAGGOTS FROM BLOW FLIES.——VI. INTESTINAL WORMS.——VII. THE ROT OR LIVER FLUKE.——VIII. LUNG WORMS.——IX. SHEEP WORRIED BY DOGS.——X. SPRAINS, STRAINS AND BRUISES.——XI. CARE WHEN LAMBING.——XII. NAVEL ILL.

I. Scab, Ticks and Lice.

Causes.—Scab is produced by a minute microscopic, parasitic insect, which burrowing just beneath the cuticle, produces extreme irritation, and causes the exudation of a watery fluid, serum. This, in drying, forms the scab which brings away with it the wool in larger or smaller patches.



DEMODEX

Is found in sebaceous glands of the sheep and dog; it causes skin irritation and eruption.

The disease is very contagious, and the insect is so tenacious of life that it has been said to have remained in a pasture three years and then spread the infection. A careful flock master should examine every sheep purchased minutely, and take every means to keep the infection from his flock. The illustration shows sheep affected with scab in its extreme form.

How to know it.—The sheep will be restless and irritable; will rub against anything near; will bite its fleece, and scratch with its hoofs. At length the fleece becomes ragged, and drops off, to permanently infect the pasture.

What to do.—It is not difficult to cure, but the means must be thorough. A good effective remedy, though poisonous, is the following:

No. 6.

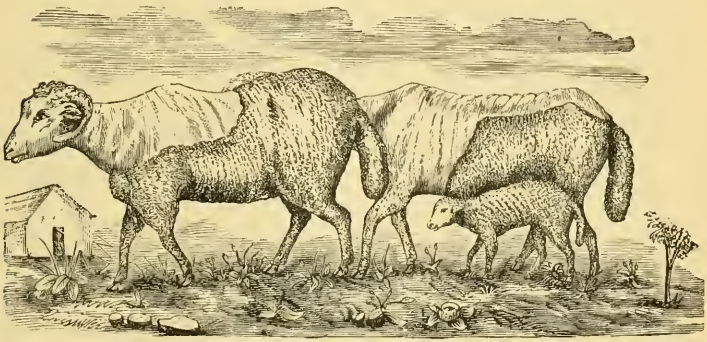
6 Pounds arsenic,
6 Pounds pearl ash,
6 Pounds sulphur,
6 Pounds soft soap,
20 Gallons boiling water.

Mix, but avoid the fumes, and when cold, add 180 gallons of cold water, and stir until well mixed. Prepare a tank that will readily allow a sheep to be dipped in it. From this a slanting, slotted drain, having a water-tight bottom underneath, and extending just over the edge of the tank, should be laid. Dip the sheep, back foremost, into the tank, allowing him to remain submerged in the liquid, *except the head*, for one minute. Then

place him on the slats and squeeze the wool thoroughly, and when well drained turn into a clean yard until dry. Then go over the heads of the flock with the following:

No. 7. 2 Pounds mercurial ointment,
6 Pounds lard,
2 Pounds rosin,
1 Pound oil of turpentine.

Place the lard and mercurial ointment in a suitable iron pot, and immerse in a vessel of hot water, say about 180 degrees, and stir until well mixed. Then dissolve the rosin and turpentine, and when the lard is cold, rub it all well together. Apply it by parting the wool on the head between the ears, on the forehead, and under the jaws, the idea being to reach every part not touched by the dip.



SCAB IN SHEEP.

In preparing No. 6, for ordinary cases, twenty pounds of strong tobacco may be simmered in the water, instead of the arsenic, and the other ingredients may be stirred in while the liquid is boiling hot, having first removed the tobacco leaves and stems. When this dip is used, the head may also be dipped, from time to time, being careful that the liquor does not get in the nose and eyes. The sheep may remain in the liquor, as hot as can be borne, four or five minutes, dipping the head occasionally, and No. 7 need not be used though it would be better. The wool must be pressed and dried, as before stated; so proceed until the flock is all gone over, using some means to keep the liquor hot

A dip in great repute in Australia, where immense flocks are kept, is the following:

No. 8.
10 Pounds tobacco leaves,
10 Pounds sulphur.
50 Gallons water.

Boil the tobacco in the water, and add the sulphur while hot. Dip the sheep in the liquor, as hot as can be borne, for five minutes.

Tick.—The sheep tick is a dipterous insect, but with no wings developed. The ticks are large and live on the surface of the skin and suck blood. They are plainly seen when the wool is divided, or when the sheep are shorn; then the ticks will go off to the lambs, where there is more wool. The treatment for them may be the same as for scab.

SHEEP TICK WITH EGGS.

Lice.—Lice are sometimes found on sheep; they are of the variety of bird lice, (Trichodectes), with large, broad head, with biting jaws, but no sucking tube. Bird lice are usually very irritating. The treatment given above will apply for lice as well as for scab and tick.

TRICHODECTES OF THE SHEEP.

II. Foot Rot.

How to know it.—The skin at the top of the clefts of the hoofs and over the heels, which is naturally smooth, dry and pale, becomes red, moist, warm and rough, as though chafed. Next, there is a discharge; and ulcers form, extending down to the upper portion of the inner wall of the hoof. Then the walls become disorganized, and the disease penetrative, between the fleshy sole and the bottom of the hoof, an offensive and purulent matter is thrown out, and the whole foot becomes a mass of corruption, often filled with maggots. The animal early becomes lame and loses appetite, and at length dies from exhaustion. If the attack is violent, and in the first cases it generally is, it may reappear the second and third years, but in a milder form, if proper measures be taken, and this should be done at the first symptoms of lameness.

What to do.—Cut away all the diseased parts, cleaning the knife from time to time in weak carbolic acid. Prepare a tank and fill it to a depth of four inches with a saturated solution of blue vitriol (sulphate of copper). Keep this as hot as the sheep can bear to stand in, by occasionally introducing a piece of hot iron. Let each sheep stand in this for ten minutes or more. Then cover the hoof with chloride of lime, and

fill the cleft of the hoof with a fillet of tow, long enough for the ends to be twisted into a string to tie about the fetlock. Keep the sheep in a dry, well-littered yard on dry, short pasture, and examine the hoofs daily for some time. Renew the chloride of lime, if necessary, and feed plenty of nourishing food. It is probable that a tonic may be needed; if so, prepare the following:

No. 9. 2 Drachms common salt,
½ Drachm sulphate of iron,
½ Drachm nitrate of potash.

Mix as a powder, and give once a day, as circumstances may dictate.

III. Foul in the Foot.

This is a common disability, especially in sheep that have been driven on the road.

What to do.—When it is only the effect of travel, the remedy is simple. Wash the cleft and other parts of the hoof with warm, soapy water, and then touch the tender or thin parts with a feather dipped in oil of vitriol (sulphuric acid), and cover them with tar. Apply a strong solution of blue vitriol (sulphate of copper), to the cleft if any signs of foul are apparent. In driving sheep, these three things, viz., soap, sulphuric acid and blue vitriol should be kept on hand; or in place of sulphuric acid the following:

No. 10. 1 Part solution chloride of antimony,
1 Part compound tincture of myrrh.

Mix and keep ready for use in incipient foul or travel sore. If it is a bad case the foot should be bandaged.

IV. Swollen Foot and Gravel.

How to know it.—The issue (biplex canal in the front and upper part of the hoof) becomes swollen and inflamed.

What to do.—Examine it to find if any substance is imbedded therein; if so, extract it; if swollen and inflamed, treat as advised for other swellings; if ulcerated lance it lightly to let out the matter, and dress with the compound tincture of myrrh. If the hoof becomes graveled, extract the gravel at any cost; dress as above, and cover with a small plug of tow dipped in tar.

V. Maggots from Blow Flies.

There should be no excuse for maggots accumulating in wounds, much less from the collection of filth about the thighs. If found, cleanse the

parts thoroughly, extract the maggots and touch the wounds with the following:

No. 11.
1 Part creosote,
4 Parts alcohol.
Mix.

Bathe daily with tincture of myrrh.

Prevention.—Keep the sheep well tagged by shearing from under the tail and thence diagonally down the thighs.

VI. Intestinal Worms.

The presence of intestinal worms is seldom known to the ordinary observer until after the death of the sheep, when they may be found by dissection. If the worms are thus found, the presumption is good that other sheep are seriously infected, for, as a rule, unless they are abundant, they do little or no harm.

What to do.—As a simple vermifuge, when their presence is suspected, ordinary wood soot, mixed with the salt the sheep naturally take will do good. In fact, if sheep are allowed plenty of salt, with the soot mixture once a week, when worms are suspected they will do well enough; or give every two weeks, in ground feed, the following, which is enough for 80 to 100 sheep:

No. 12.
2 Pounds common salt.
1 Pound sulphate of magnesia,
½ Pound sulphate of iron,
½ Pound powdered gentian,
Mix.

For good simple vermifuge for round and thread worms, to be given as a drench, take

No. 13.
4 Ounces linseed oil,
½ Ounce oil of turpentine.
Mix.

If the sheep are known to have tape worm, give in molasses and water the following:

No. 14.
2 to 4 Drachms powdered areca nut,
10 to 20 Drops oil of male-fern,
Mix.

The first quantities for small, and the latter for large sheep.

In the case of a large sheep, administer half a pint of linseed oil on the following day.

VII. The Rot or Liver Fluke.

Causes.—Small flat worms (*Fasciola Hepatica and Distoneum Lanceolatum*) in the liver, called the liver fluke, are the cause of rot.

How to know it.—There will be tenderness and weakness about the loins; the belly will be swollen and enlarged; the eyes yellow as in jaundice; and if the skin be rubbed back and forth, when taken up between the thumb and fingers, it is soft and flabby, with a crackling sensation.

FASCIOLA HEPATICA.

What to do.—If there is diarrhœa, a weak heart beat, and general stupor, remove the sheep to a high dry pasture, or to well ventilated airy places, as the case may be. Prepare the following:

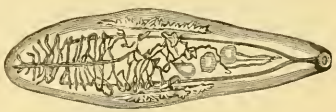
No. 15.
½ Pound sulphate of magnesia.
6 Drachms oil of turpentine.

Mix the magnesia sulphate with three half pints of water, add the turpentine and give one-third of it every two days, shaking the bottle before using.

Follow the above with the tonic:

No. 16.
40 Pounds oat meal.
4 Pounds powdered gentian or anise seed.
4 Pounds common salt.
1 Pound sulphate of iron.
Mix.

Give half a pint to each sheep once a day for a week; then wait three weeks and repeat. Remove the sheep to high dry pasture or salt marsh, both being poisonous to the fluke. Do not put the sheep in a wet pasture, for there they only sow the seed to perpetuate the trouble.

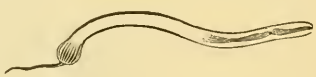


DISTOMEUM LANCEOLATUM.

VIII. Lung Worms.

Causes.—This disease is caused by the presence of worms (*Strongylus Filaria*), which are usually found in the wind-pipe, and bronchial tubes and sometimes in the lungs.

How to know it.—There will be a husky cough; quickened breathing; loss of appetite and flesh; and the sheep will rub its nose on the ground; there may be dysentery with fœtid evacuations. Examine the mouth and throat, and also the stools, for indications of the worms. Prepare the following:



STRONGYLUS FILARIA, MALE ENLARGED.

No. 17.
6 Ounces sulphate of magnesia.
4 Ounces nitrate of potash.
4 Ounces sulphur.
4 Ounces sulphate of iron.
Mix.

Give a single handful to each sheep in oat or corn meal once a day for a week; then wait three weeks and repeat. Burn turpentine on pine shavings under their noses so as to make them breathe the fumes.

IX. Sheep worried by Dogs.

Sheep that have been torn by dogs, are apt to die, owing to the lacerated nature of the wound, especially if the skin has been stripped from considerable surface in hot weather.

What to do.—The lacerated surfaces must be brought together, in such a way that they may unite; and, if necessary, stitched. In hot weather flies must be guarded against, and the wounds should be treated as advised in the case of horses when wounded.

X. Sprains, Strains and Bruises.

What to do.—These also are to be treated precisely as advised in the case of horses. In simple cases hot fomentations and the subsequent application of camphor is the rule usually followed. For a sprain, to immerse the limb in water as hot as can be borne, for half an hour at a time, and repeated several times a day, usually effects a rapid cure.

XI. Care when Lambing.

What to do.—The ewes should be well fed for several weeks previous to lambing, so as to be strong and have the lambs strong and well developed when dropped; but avoid having the ewes fat. Have a dry, comfortable place for them to run in, not too warm; they should be put in a

SWELLING OF THE UMBILICUS IN CHARBON (NAVEL ILL.)

warmer place when lambing than they have been accustomed to, in order to avoid chilling the lamb. Allow no spectators around the sheep while lambing, except the man they are accustomed to; let him watch the progress of events to see that help is given if needed.

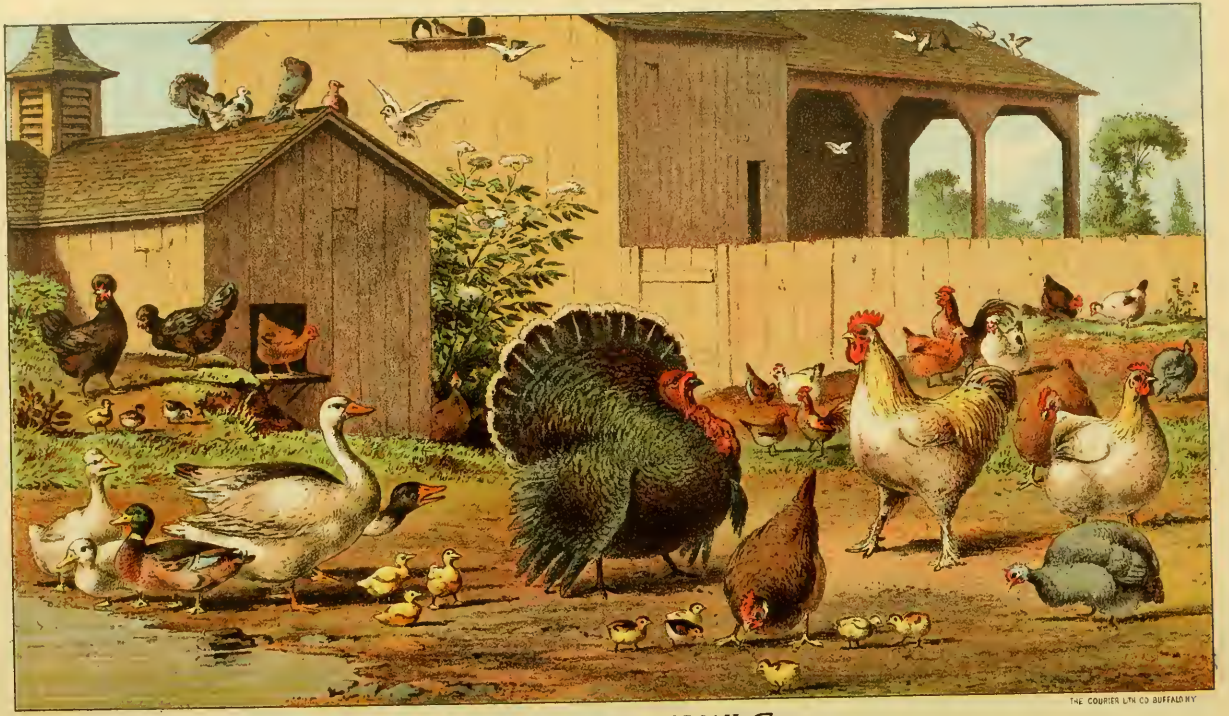
Sometimes wrong presentations are made, and then the shepherd should be ready with his hand oiled and warmed in warm water to render assistance; let him insert his hand and change the position of the fœtus as the case requires, being very careful indeed not to wound or torture the ewe.

If the lamb is dropped at night and gets chilled, put it into a warm water bath and dry it thoroughly when taken out, and give it a few spoonfuls of milk, diluted a little and sweetened, and with a dusting of red pepper in it. Keep the ewe separate from the others for a week or ten days, and feed on soft food and roots if it is too early for grass.

XII. Navel Ill.

Charbonous fever, or carbuncular erysipelas in lambs, in addition to the other symptoms, usually manifests itself in swelling of the umbilicus. The swellings are not confined to the umbilical region, but are often found in other parts of the body. It is sometimes seen as a symptom or complication of rheumatic disease of the joints of lambs, foals and calves. It was considered by shepherds, not many years ago, to be a distinct disease, known as Navel Ill. See illustration on preceding page.

THE BOT.



DOMESTIC FOWLS.

PART IX.

POULTRY.

HISTORY, MANAGEMENT AND CHARACTERISTICS OF THE VARIOUS BREEDS.

POULTRY.

CHAPTER I.

ORIGIN AND VARIETIES OF FARM BIRDS.

I. ORIGIN OF THE WORD POULTRY.——II. TYPES AND NATIVE COUNTRY OF BARN-YARD FOWLS.——III. CHANGES DUE TO BREEDING.——IV. DIVISION OF FOWLS.——V. THE WILD TURKEY.——VI. DUCKS.——VII. GEESE.——VIII. THE SWAN.——IX. PHEASANTS.——X. GUINEA FOWLS.——XI. PEAFOWLS.——XII. ANATOMY OF THE HEN.

I. Origin of the Word Poultry.

The word poultry comes from the Latin word *pullus*, a chicken, or the young of any animal. In its broad sense it is now used to designate any domestic fowl bred or fed for human food, and for the eggs and feathers. Hence, the peacock may reasonably be included, since its feathers are an important article of commerce. The modern word poultry, however, more properly comes from the French word *poule*, hen, just as our word pullet comes from the French *poulet*, a chick. The cut of the French Creve Cœur will illustrate a singular departure from the wild type given on the next page. In a more modern sense the word poultry is generally applied to barn-yard fowls or the genus *gallus*—the word fowl being used with a prefix, as water-fowl, which includes ducks and geese, Guinea-fowl, etc., while turkeys, peacocks, pheasants and other later or only partially domesticated birds are designated by their proper or common names.

II. Types and Native Country of Barn-Yard Fowls.

The originals of all the varieties of barn-yard fowls were inhabitants of thickets, and other openings of the forests, rather than of the dense forest itself; there are a number of species. A variety closely resembling our common barn yard fowl, is the Sonnerat fowl, (*Gallus Sonneratii*) a native of the Ghautes, separating Malabar from Coromandel. Dampbier, previous to the discovery of Sonnerat, found wild fowls closely resembling our old barn-yard fowls in the islands of the Indian Archipelago. So it may safely be said, that our fowls with long flowing tails, are natives of India.

III. Changes Due to Breeding.

The great wild species of Southern Asia, and the wild Malay and Chittagong, were probably influential in modifying the large Asiatic breeds of to-day; and our bantams undoubtedly spring from the Bankiva jungle fowl, although careful and systematic breeding and selection have given us bantams of all the principal breeds of barn-yard fowls, including the games. Again, as showing a marked departure from the wild form, we

CREVE CŒUR COCK AND HEN.

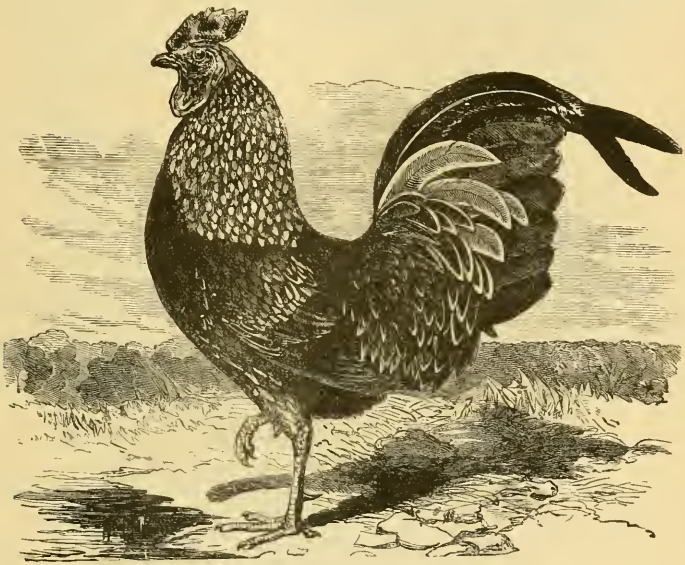
give cuts of two heads, one the Breda, or Gueldre, retaining the wattles, but not the marked comb, and a variety of Brahma, with no wattles, and with only the rudiments of a comb.

IV. Division of Fowls.

Our barn-yard fowls may therefore be divided into the common or mixed breeds, Asiatic fowls, European and American varieties, and Bantams. Each of these will be treated in their proper places.

V. The Wild Turkey.

The wild turkey is a native only of America; there are several so-called species, but they are, however, only varieties that have bred constant to type, perhaps having escaped from some ancient domestication. They are all fertile one with another. The turkey is native to all that region from Central America, north, up to 45 degrees, wherever suitable timber covert can be found; but in all the more thickly settled regions they have long since been exterminated. The illustrations show the common wild turkey hen, and the Mexican wild turkey cock.

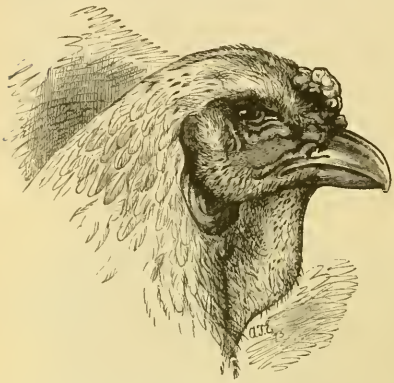


GALLUS SONNERATII.

VI. Ducks.

None of the wild fowl seem to have been more easily domesticated than the duck, though the domestication of birds of any species seems easy, whenever they prove valuable enough to pay their keeping. Only the larger varieties have, as a rule, been thought worth domestication, though of late years some of the smaller and beautifully plumaged birds have been bred in a tame state. They make very handsome adjuncts to water scenery, in connection with swans and the rarer species of geese.

The common white duck and the Rouen are two of the oldest domesticated varieties of ducks; while the Cayuga, or black duck, an American variety is among the latest.



HEAD OF SINGLE WATTLED BRAHMA FOWL.

HEAD OF BREDA, OR GUELDRE.

VII. Geese.

Geese, as well as ducks, being birds of passage, are found in all climates, from sub-tropical latitudes up to the Arctic Circle. Following the

WILD TURKEY HEN.

season of spring into the North, they breed in summer from latitude forty-five up to sixty, and return in the autumn to their winter quarters

in the sub-tropical regions. The common gray goose is the nearest ap-

MEXICAN WILD TURKEY COCK.

proach to the wild type, and these are becoming scarcer and scarcer each

year, gradually giving way to improved breeds. Of these, the Embden, or Bremen, combine a pure white color, softness of color, and heavy weight. The origin of the gray and the white geese is generally sup-

CAYUGA DUCKS.

posed to be the Gray-lag goose (*Anser Ferus*), of the North of Europe. The American wild goose (*Anser Canadensis*), is a distinct species; this variety breeds freely, and is tolerably contented under domestication,

even in the first generation. It is but a few years, comparatively, since they were first domesticated. Asia and Africa have furnished us with

EMDEN, OR BREMEN GEESE.

four sub-families of geese, three of which come from China, and the fourth from Africa—the African goose.

VIII. The Swan.

The swan has long been known in history, but is not a useful bird except as an ornamental appendage to the ponds and lakes of parks. The most common is the white swan; there are, besides, a number of rare and ornamental varieties, among them the black swan from Australia, and the black-necked Chili swan. The head and neck of the latter are jet black; the body, wings, and tail, pure white, the bill having a red knob or protuberance.

IX. Pheasants.

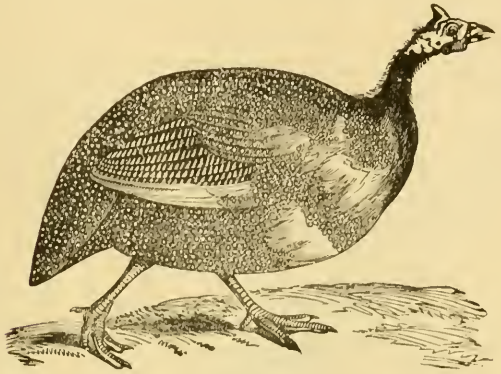
None of the pheasants (*Phasianus*) are natives of the United States, the so-called pheasant of the South and some other sections of the United States being really the ruffed grouse (*Tetrao umbellus*). The common half-domesticated pheasant of Europe and America (*Phasianus Colchicus*) is found wild in the Caucasus, and about the Caspian Sea. In the United States we have five varieties which breed in confinement, but none of them are more capable of domestication than the peacock. These varieties are: The ring-necked, originally from China; the ash-colored; the white; and the parti-colored.

The ring-necked pheasant is said to be originally from China. The male of the silver pheasant (*Phasianus nycthemerus*) originally from the north of China, is a most beautiful bird, of a silver white color, with regular, slender, lace-like black markings on the feathers of the back, while the under parts are of a black color; the long, drooping tail is also silver white, barred with black. The female is of a dull reddish color, and of a smaller size. The golden pheasant (*Phasianus thaumalea pictus*) is one of the most beautiful of birds, bred in a state of half-domestication, and is much smaller than either of the pheasants before mentioned. The under part of the male is of a red color, the head is ornamented with a splendid golden yellow crest, the neck is hidden or overhung by a somewhat projecting ruff of feathers of a bright yellow color, striped or barred with black. The wings are of a dull blue, the hind parts of the body are of a golden color, set off with red, and the tail is long and brown, barred with black. The female of this species is also inconspicuous in color.

These birds have bred well in some forests in Europe, and in a state of domestication have produced three varieties, viz: the ordinary golden and red color, the black, and the Isabella or fawn. They all, like the Guinea-fowl and peafowl, roost on high trees and elevated points, and wander considerably; but in close confinement they will permit handling.

X. Guinea-Fowls.

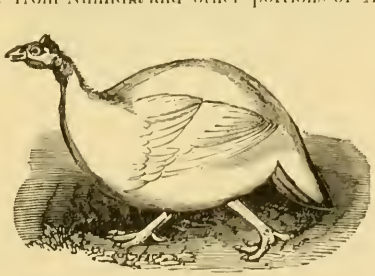
Guinea fowls are of two varieties and are now quite widely disseminated. The varieties are, the pearl and the white, the latter yet rather rare. They have been grouped by naturalists into a number of varieties,



SPECKLED GUINEA-FOWL.

but the distinction was more fanciful than real, since all the varieties readily mate one with the other, and the progeny are continuously fertile together.

Their original home may be inferred from their generic name, *Numida;* they come from Numidia and other portions of Africa from Gam-



WHITE GUINEA-FOWL.

bia to the Gaboon. The so called Cape Verde and Jamaica Guinea-fowls are undoubtedly descendants of these, become wild after having been carried there. The cuts of the white and speckled species will give a

good idea of the whole tribe. A very rare species is the Vulturine Guinea-fowl, so called for its vulture-like head and neck. The whole species are among the most watchful and wary of birds, giving instant alarm with their shrill note of danger. When bred, they should be allowed full liberty, since they do not stand confinement well.

XI. Peafowls.

This magnificent bird, quite useless except for the splendor of its plumage and the value of its tail feathers, is rare in farm yards, from its supposed want of adaptation to northern climates. This, however, is a mistake; they are as hardy as most of the breeds of barn-yard fowls. The male is cruel and cowardly, and is given to destroying the eggs of the

PEACOCK.

female. Hence the hens are very secret as to their nests. They do not lay their eggs until late in the season, and keep their broods away from the yards until driven thither in the autumn for want of food. They have considerable powers of flight, and the males, especially, wander long distances from home; they should be allowed their full liberty.

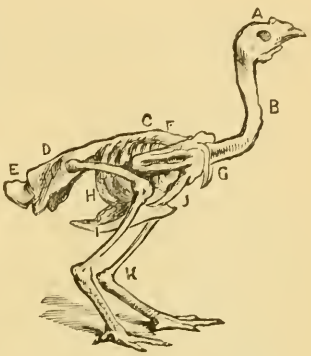
XII. Anatomy of the Hen.

The anatomy of the hen will answer for all the land birds, and, in a measure (for all but the scientific breeder) for water-fowls as well, since the frame of the latter is only so modified as to permit their swimming and diving in water. Both in land and water-fowls the more valuable

portions for food are the breast, the thigh, the leg, the neck and the wing. The back and rump give but little flesh, very choice in flavor.

Fig. 1 represents the skeleton of a hen of average size and in the proportions as ordinarily met with.

Explanation.—*A*—The head, length 2 3-4 inches. *B*—The neck, length 5 1-3 inches. *C*—The back or spine. *D*—The hips or hip bones, (the back and hips comprise from the shoulder to the tail.) length 5 9-10 inches. *E*—Rump or coccygis, length, 1 1-2 inches. *F*—Shoulder-blade or shoulder. *G*—Collar bone or 'merry-thought.' *H*—Chest or thorax, composed of the sides and breast-bone (bone of the throat); it contains the heart, liver, etc. *I*—The breast-bone, length a little over 3 1-2 inches. *J*—The wing bones, as will be seen, are composed of the humerus or shoulder-bone of the wing, length 3 1-7 inches; also the radius and the cubitus, the fore-arm or pinion, length 2 3-4 inches; the tip of the wing, or that which takes the place of the hand and fingers, length 2 1-3 inches. *K*—The leg, composed of *d*— (Fig. 2.) the thigh bone, length 3 1-7 inches; *e*—the shin bone, length 4 1-3 inches; *f*—the bone of the foot, the tarsus, length 3 1-7 inches; *g*—the claws, that of the middle, length 2 1-3 inches; the two to the right and left, length 1 6-10 inches; that of the back, length 8-10 inches; *h*—the patella or knee; *i*—the os calcis or heel.



ANATOMY OF THE HEN. (Fig 1).

(Fig. 2).

The foot as shown in Fig. 2, is all that part (*f*) from (*g*) to (*i*). The hen—like nearly all four-footed animals, and unlike man—walks on the toes. If the hen walked on the foot, all that portion from the toe nails up to *i*, would rest on the ground, and hence the position of the rear toe would be different. As it is placed, it supports the other toes in walking and especially when on the perch, at night; for all land breeds are peculiar in this, that when they are at rest, they retain their position securely by the simple weight of the body, which causes the sinews and muscles to contract and thus draw the toes firmly around the object grasped. Some fowls have five, and even six toes, but four only are used to advantage—three before and one behind. The rest are really supernumerary—as much so as two thumbs on a man's hand.

CHAPTER II.

BARN-YARD FOWLS.

1. ENGLISH BREEDS—DORKING FOWLS.——II. SILVER GRAY DORKINGS.——III. GRAY DORKINGS.——IV. FAWN-COLORED DORKINGS.——V. BLACK DORKINGS.——VI. BOLTON GRAYS, OR CREOLES.——VII. FRENCH FOWLS—HOUDANS.——VIII. LA FLECHE FOWLS.——IX. CREVE CŒURS.——X. BREDA OR GUELDER FOWLS.——XI. SPANISH FOWLS.——XII. HAMBURG FOWLS—BLACK HAMBURG.——XIII. PENCILED HAMBURGS.——XIV. LEGHORN FOWLS.——XV. WHITE LEGHORNS.——XVI. AMERICAN BREEDS.——XVII. DOMINIQUE FOWLS.——XVIII. OSTRICH FOWLS.——XIX. PLYMOUTH ROCK FOWLS.

I. English Breeds—Dorking Fowls.

Of the distinct English breeds of barn yard fowls, the Dorkings, in their varieties, confessedly stand first. The old White or Surrey Dorking is the original type from which the others have sprung. The Dorkings all have five toes, are full wattled, with long sickle-shaped tail feathers and generally single serrated combs. The White Dorkings are plump, compact birds with strong head and bill. The plumage is pure white without spot, and the legs, also, are white. The mature cock will weigh fully ten pounds, the hen eight or nine pounds, and year-old birds eight or nine pounds when fat. They are fairly hardy, good layers, careful and watchful of the brood: and the flesh is most excellent. None of the Dorkings can stand cold storms; but they are altogether the best of the distinct English breeds.

II. Silver-Gray Dorkings.

The Silver-gray Dorking is undoubtedly a chance variety of the White Dorking, which has been continued by careful breeding and selection. They vary much in their markings, unless the greatest care is used, and even then many chicks must be discarded from the breeding yards. Their mixed origin is fully shown in the fact that dark colored birds often produce handsome silver-gray chicks.

III. Gray Dorking.

The distinguishing colors of this variety are: Breast, tail and larger tail feathers perfectly black; the head, neck, hackle, back, saddle, and wing bow a clear, pure, silvery white; and across the wings a well defined black bar, in striking contrast with the white outside web of the

quill feathers and the white hackle of the neck and saddle. The neck of the hen is silvery white; the breast salmon red, changing to gray near the thighs; the wings silvery or slaty gray, without any tinge of red; the tail dark red, the inside nearly black. The chicks grow rapidly, if well fed, so that they may be made ready for broiling before they are fully fattened.

WHITE DORKING COCK.

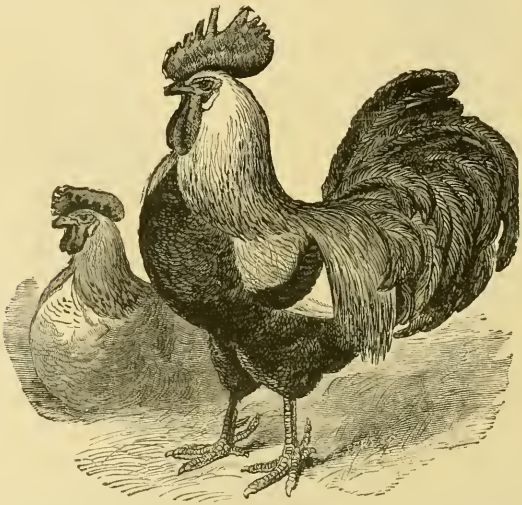
IV. Fawn-colored Dorkings.

Birds of this variety are handsome, but with tails shorter than the others; they have black legs and a high carriage. The hens lay large eggs. The matured cocks will weigh up to nine pounds and the hens seven

pounds of excellent flesh. They are said to have been produced by a cross between the White Dorkings and the fawn-colored Turkish fowl.

V. Black Dorkings.

The black Dorkings differ but little from the other varieties. They are, however, thought to be more hardy than the other sub-families; the hens are good layers and careful nurses, and the eggs are large. According to Wright, the pure-breds are jet black; the neck of some cocks tinged



GRAY DORKINGS.

with gold, and the hens silver tinged; the comb usually double, short, sometimes cupped, but sometimes single; the wattles small; the tail feathers shorter and broader than those of the White Dorking; the legs black, short, and with the two under toes separate and distinct.

VI. Bolton Grays or Creoles.

This breed, once famous in England, was said to have been bred with such nicety that individual fowls could scarcely be distinguished one from another. They are great layers; not inclined to set; short-legged; plump; medium-sized; the eggs, however, rather small; the color is white, thickly spotted with black as to the neck and body, with black bars at the extremity of the tail.

VII. French Fowls—Houdans.

The four varieties of French fowls that have been more or less disseminated in the United States are the Houdans, the Creve Cœur, La Fleche, and the Breda.

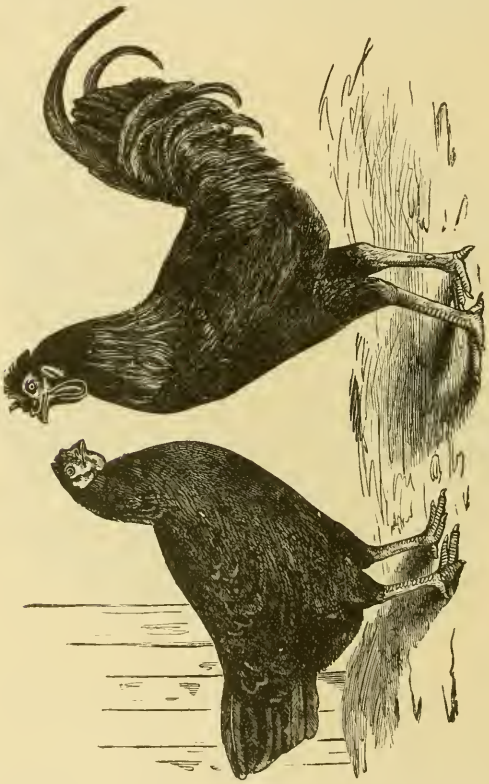
The Houdans rank in France with the Dorkings in England, and in the United States they are regarded with favor. They are said to have been originated from a cross between the Dorking and the silver Padoue, and have the fifth toe as do the Dorkings. In color they should be white

HOUDAN HEN.

and black, evenly distributed, making them distinctly speckled. Red feathers are not admissible, but an occasional stained feather is sometimes seen in the best fowls. They love to wander, but bear confinement well. The comb is double leafed, and they have whiskers and beard growing well up on the face which, with the crest or top-knot, gives them a curious appearance. The crest of the hen is quite thick, rounded and full. They are hardy, fatten kindly, lay good-sized eggs, and the flesh is of the first quality.

VIII. La Fleche Fowls.

These are hardy; tall, rather angular, but compact-bodied; jet black; strong-limbed, with dense, firm plumage. They lay excellent eggs, and the flesh is superior to that of any other French breed, and excelled probably by none. They are a full wattled fowl, and the protuberant



LA FLECHE COCK AND HEN

feathers behind the serrate comb give them the appearance of being double horned. Their ears are large and opaque. The beak moderately curved, neck hackles long and fine, reflecting violet and green-black colors, as do the breast, wings and upper tail feathers. The legs are

long, slate-blue in young fowls, and a lead-gray when old. The hen is colored like the cock. The cocks are fully mature at a year and a half old and the hens at twelve months.

IX. Creve Cœurs.

The Creve Cœurs are among the most elegant and stately of French fowls. Their color is black, reflected with a glistening greenish hue;

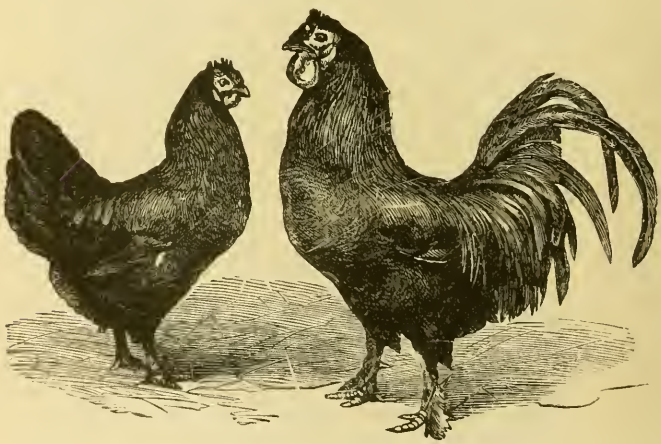
CREVE CŒUR FOWLS.

their antler-like, deep crimson combs and crested heads give them a bold, striking and dignified appearance. They are, also, probably the most useful of the French breeds, when we take into consideration their good feeding qualities, their great merit as steady producers of large

eggs, their easy fattening qualities, and their constitutional hardiness. Their color should be jet black, though as age approaches an occasional white feather may appear in the crest. They are short-legged, compact fowls, with little offal, and of the non-sitting order—so much so that the eggs should be placed under other hens, or those more apt to be reliable as sitters and nurses. In England they are reputed somewhat tender, but in the United States we have heard no complaints of this kind, after they were once acclimated. The heads of the cocks are topped with handsome crests, before which are seen large, toothed, two-horned combs. Their wattles are handsome and pendent, and they have dense cravats of feathers on the fore part of the neck. The illustration admirably shows their chief characteristics.

X. Breda or Gueldre Fowls.

These fowls are called after the French province of the same name, where the breed originated; but though they are classed as French fowls they evidently show an infusion of Asiatic blood, while they are Polish in



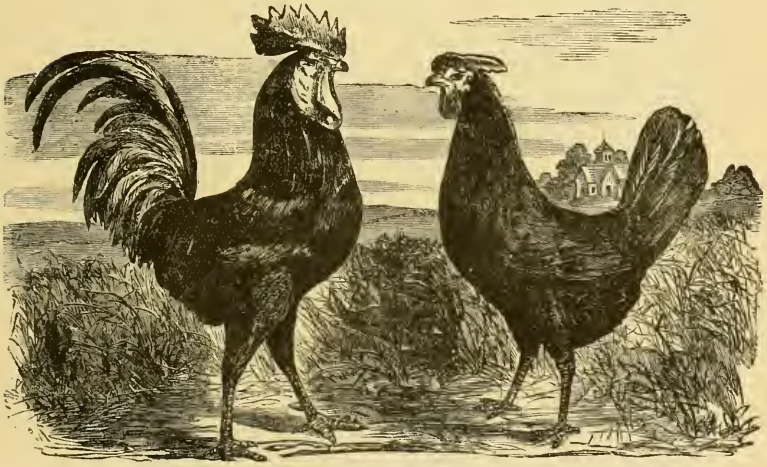
BREDA OR GUELDRE FOWLS.

shape and undoubtedly closely allied to that breed. There are several such varieties distinguished by color—the cuckoo-marked being called Gueldres, and the black, Bredas, though the latter term seems to be applied to all that are not cuckoo or dominique marked.

They have just a perceptible crest, pendent wattles, and very little comb. Whatever the color, they have but few feathers on the legs, which are slaty blue, and the thighs vulture hocked. The plumage is close and compact, the ear lobes and wattles bright red and peculiar in shape. The chicks are hardy and feather quickly, and the eggs are large, smooth and excellent in flavor. Two peculiarities of this breed are the almost total absence of comb, causing a depression in that part, and their cavernous and conspicuous nostrils. The accompanying illustration, together with the cut of head on a previous page, will sufficiently portray their distinguishing characteristics.

XI. Spanish Fowls.

There are a number of Spanish varieties besides the Pure Black and the Pure White, as the Minorca or Red-faced Black, the Ancona, the Gray or mottled, and the Andalusian or Blue Spanish. They have long been valued in the United States for their great laying and non-sitting



BLACK SPANISH FOWLS.

qualities, but are too tender to stand a northern climate, without extra protection, and they do not do well anywhere, when exposed to wet. With proper attention, the fancier may get good returns in large, meaty, well-flavored eggs, and plenty of them. To the average farmer they are not a valuable breed.

The characteristics of the two principal varieties are sufficiently well portrayed by the illustration in connection with the following discription: The weight of a full-grown Spanish cock should not be less than seven

BLACK HAMBURGS.

pounds, nor its height, when erect, less than twenty-two inches. The color should be pure black, or pure white, according to the variety, without white in the black or black feathers in the white variety. The eye should be full, bright and of a dark brown color. The ear lobes and

white face are important characteristics; the comb of the cocks high, firm, single and deeply serrated, while in the hens it will often fall over on one side; the wattles large, long, and of the deepest vermilion color, as is also the comb.

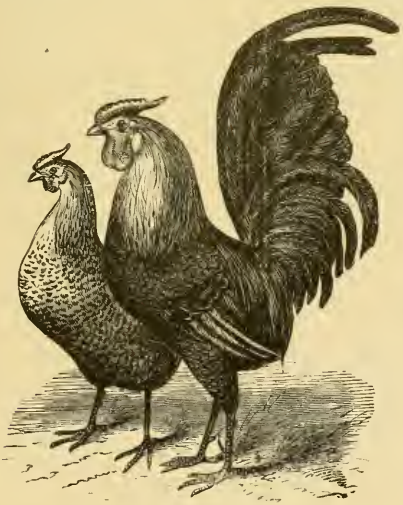
XII. Hamburg Fowls—Black Hamburg.

All the Hamburg fowls have these constant characteristics: Bright, double combs, firmly fixed, and ending in a long point behind and somewhat turned up; medium size; upright carriage; long upright tails, and long flowing plume feathers. They are hardy and robust, great layers of excellent flavored eggs, but seldom sit, even when they have a free range, and almost never when kept confined.

The black Hamburg is one of the best of fowls for farms where free range can be had and plenty of eggs are desired. They will lay even in the coldest weather if given warm quarters and warm food. The eggs are not large, but they make up in quality what they lack in size. The plumage should be deep black, relieved with a metallic lustre.

XIII. Penciled Hamburgs.

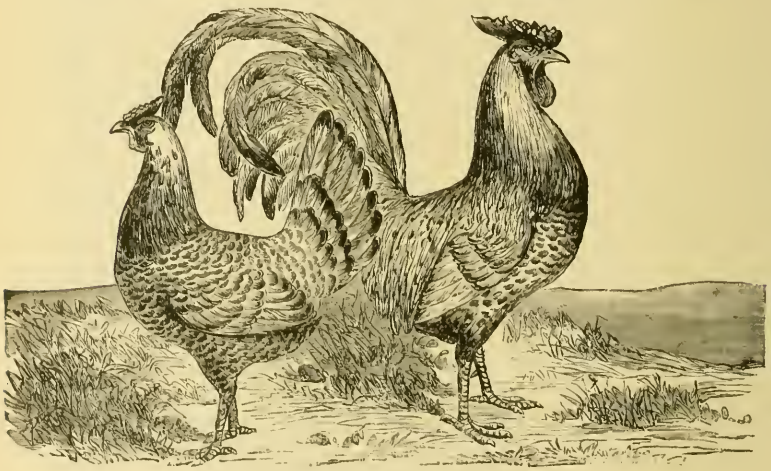
There are two varieties,—viz., Golden and Silver penciled, as there are two varieties of Spangled Hamburgs, the Golden and the Silver. In fact,



GOLDEN PENCILED HAMBURGS.

the Silver penciled variety are probably but little different from the old Bolton Gray, previously described, and descended probably direct from

the Turkish fowl described long ago by Aldrovandus. Tegetmeier says of them, that perhaps no variety of fowl ever rejoiced in more synonyms than this very pretty, and, in suitable situations, profitable breed: they have been long termed *Bolton Grays*, from being extensively and successfully cultivated in and about Bolton, in Lancashire; *Creoles*, from the intermixture of the black and white in their plumage; *Creels*, which is a provincial mode of pronouncing Creoles; *Corals*, because the numerous points of their polished, bright scarlet rose combs bear no distant resemblance to red coral; *Penciled Dutch*, because many are imported from Holland; *Dutch Every-day Layers* and *Everlastings*, for the same rea-



SILVER PENCILED HAMBURGS.

son, and their great productiveness as layers; and *Chitteprats*, the derivation of which is not so obvious. Chitteface, according to Bailey, the lexicographer, means a meagre child; and *Chitteprat*, if intended to describe a diminutive hen, would not be misapplied to one of this variety.

The general characters of Penciled Hamburgs may be thus stated: They are birds of small size, compact and neat in form, sprightly and cheerful in carriage. In the plumage on the body of the hens, each feather (with the exception of those of the neck-hackle, which should be perfectly free from dark marks) is penciled with several transverse bars of black on a clear ground, which is white in the silver, and a rich bay in the golden birds. These pencilings have given rise to the name of the

variety. In the cocks, however, there is a general absence of these markings, the birds being either white or bay. In both sexes the legs are blue, with fine bone. The comb is a rose, square in front and well peaked behind; the ear-lobe a well-defined white; the face scarlet.

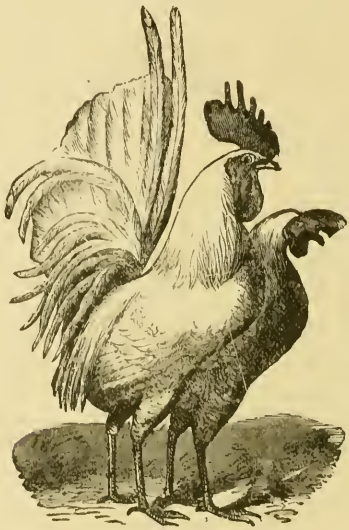
In weight and size, Silver-penciled Hamburgs are considerably below the general standard; the carriage of the cock is very erect; the tail is well borne up, and the head occasionally thrown back so far that the neck often touches the tail; the general form is exceedingly neat and elegant. In the hen the carriage is sprightly and active, but not so impudent as that of the cock; both sexes are alike noisy and restless in their habits, neat and very pretty in their form. The neck-hackle in both should be pure white; penciling with black, a very frequent fault in the hackle of the hens, being very objectionable. The saddle of the cock must be pure mealy white. The cock's tail is black, the sickle and side sickle-feathers being glossed with green, and having a narrow white edging. In the hens the tail must be distinctly barred or penciled with black.

The breast and thighs of the cock are white, as are the upper wing-coverts or shoulder, but the lower wing-coverts are marked with black on the inner web, showing a line of dots across the wing, forming a bar. The secondary quills, or those flight-feathers which are alone visible when the wing is closed, are white on the outer web and blackish on the inner web, and have a rich green-glossed black spot at the end of each feather. In the hens the entire plumage of the body, namely, that of the breast, back, wings, and thighs, should have each feather distinctly penciled or marked across with transverse bars of black; the more defined these are the better, as there should be a perfect freedom from a mossy appearance, which is caused by the two colors running into one another. The legs and feet in both sexes should be of a clear leaden or slaty blue. The comb in the cock is evenly set on the head, square in front, well sprigged above with small, even points, not hollowed on the upper surface, and terminating in a single flattened pike behind, which inclines slightly upwards. In the hen the comb is the same in form but very much smaller. The ear-lobe in both sexes must be a dead opaque white, free from red on the edge.

The hens of either variety must have the body distinctly and definitely penciled, and the hackles of either sex must be entirely free from dark markings. In the spangled varieties the markings must be distinct, like spangles, or speckled. The other characteristics range uniform with those of the other varieties. Whatever the variety, they are most valuable either to the farmer or fancier, but with the farmer, unless he be a fancier as well, if a little off color in breeding it is no detriment, so far as egg-laying is concerned.

XIV. Leghorn Fowls.

The Leghorn fowls are of the Spanish type, except in color. The White Leghorn is regarded with most favor, although the Brown Leghorn has its fanciers. There are also other grades of colors except black.



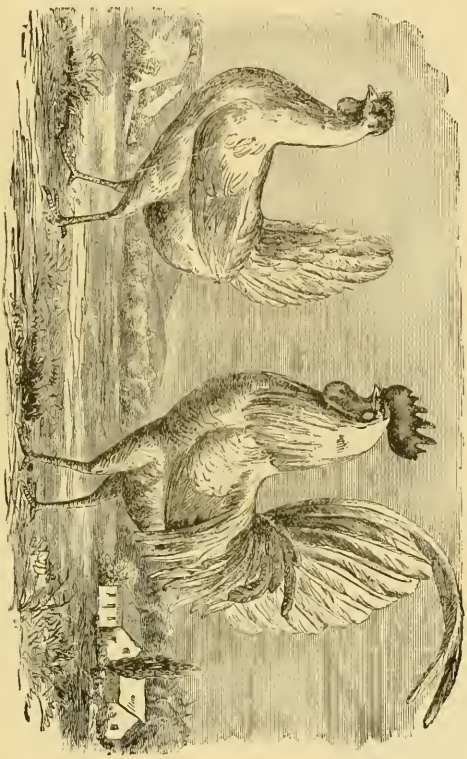
STANDARD WHITE LEGHORNS.

Whatever the color, they have all the good laying qualities of the Spanish, without their tender qualities, and indeed dispute the palm with the Hamburgs in every good point. The illustration shows what are accepted among breeders as standard White Leghorns.

XV. White Leghorns.

These birds are among the most elegant of barn-yard fowls, either in the yard of the farmer or amateur. They are similar to the Spanish in appearance, except that the plumage is white, with hackle or neck, and the saddle or rump feathers tinged golden. Unlike the Spanish, they are hardy, standing even our western winters excellently. They are good winter layers, and seldom desire to sit; the young early take care of

themselves, and feather so early that they look to be miniature fowls when six weeks or two months old. They are quiet and docile. The eggs are superior in flavor, and as a table fowl they have few superiors among the gallinaceous tribe.



WHITE LEGHORNS.

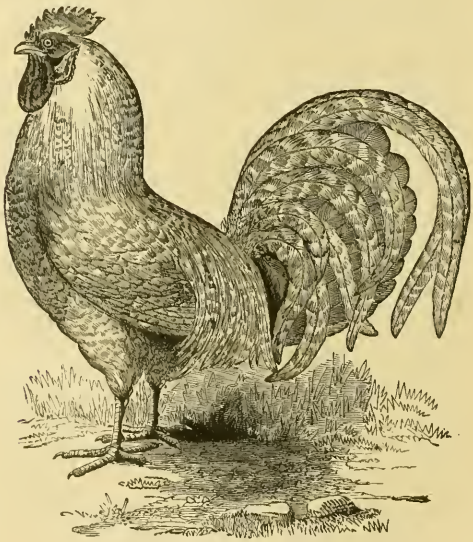
XVI. American Breeds.

The distinctive American breeds of barn-yard fowls that have attained wide celebrity are the Dominique, the Ostrich fowl, and the Plymouth Rock. The Dominique have often been confounded with the Scotch Grays, and also with the Cuckoo Dorkings and other fowls bred to the

cuckoo feather of England and France; they are, however, an old and entirely distinct American race. The Georgian Game is also a distinct American breed, but this will be treated of under the head of Games.

XVII. Dominique Fowls.

For the farm-yard, when both eggs and chickens are desired, this breed when pure, (unfortunately now rather rare), is one of the most valuable of the known breeds, for it combines hardiness of constitution with good foraging qualities; is prolific of eggs, and when killed shows plenty of good flesh. The true color is a soft and undulating shading of slaty blue, upon a light ground all over the body, thus forming bands of various



DOMINIQUE FOWL.

narrow widths, and finely penciled among the smaller feathers. The cocks have heavy hackle and saddle feathers. The feet and legs must be bright yellow or buff, and the bill of the same color. The combs of the cocks, however, are variable, some cocks having a single and others a double comb.

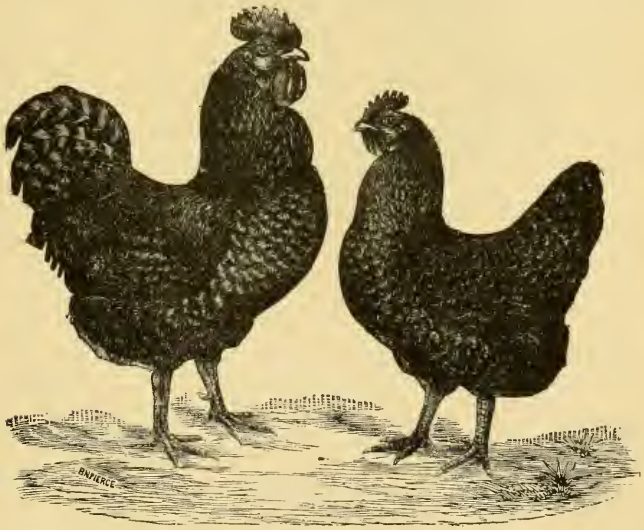
XVIII. Ostrich Fowls.

This breed is not widely disseminated, but in their native region—Bucks County, Pa.—they are highly esteemed for their weight, valuable laying qualities, excellent flesh, and hardy constitutions. The cocks will weigh nine pounds at maturity and the hens seven to eight, and will often lay forty to fifty eggs before wanting to sit. The color of the cock is blue-black, the ends of the feathers tipped with white. The wings a golden or yellow tinge, the hackle dark glossy blue. The cocks have a double rose-colored comb, and large wattles. The legs are short and strong, and the body thick and plump. The hens are marked similarly to the cock, but more soberly, and the comb is single, high and serrated.

OSTRICH FOWLS.

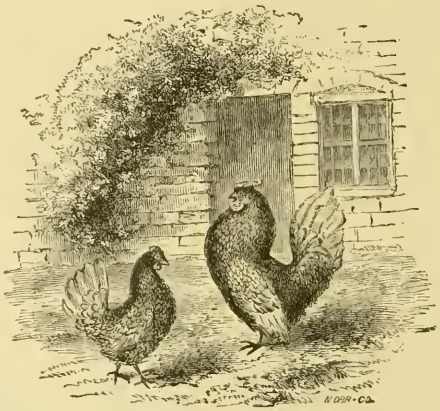
XIX. Plymouth Rock Fowls.

This is one of the latest-formed of American breeds, first shown at Boston in 1840. It is evidently a breed made up of various crosses, and



PLYMOUTH ROCKS.

unfortunately was disseminated before its characteristics became uniform or well fixed in any respect. It gave rise to much bitter controversy, in which even the common dunghill was stated to have had a large share in the origin. Of late years, what is called the Improved Plymouth Rock has appeared and shows care and uniform breeding. They are said to grow fast, fledge early, take on flesh rapidly, and to combine excellent qualities as egg producers and as table fowls. They have not yet become popular, except with a comparatively few fanciers, and for the reason, perhaps, that their really good qualities are not yet known among farmers.



A PAIR OF BANTAMS.

CHAPTER III.

GAME FOWLS AND OTHER RARE BREEDS.

I. GAME FOWLS AND THEIR VARIETIES.——II. EARL DERBY GAMES.——III. BROWN-BREASTED RED GAMES.——IV. DUCK-WINGED GAMES.——V. WHITE GEORGIAN GAMES.——VI. GAME BANTAMS.——VII. OTHER BANTAMS.——VIII. THE SEABRIGHT BANTAM.——IX. JAPANESE BANTAMS.——X. FRIZZLED FOWLS.——XI. RUMPLESS FOWLS.——XII. SILKY FOWLS.

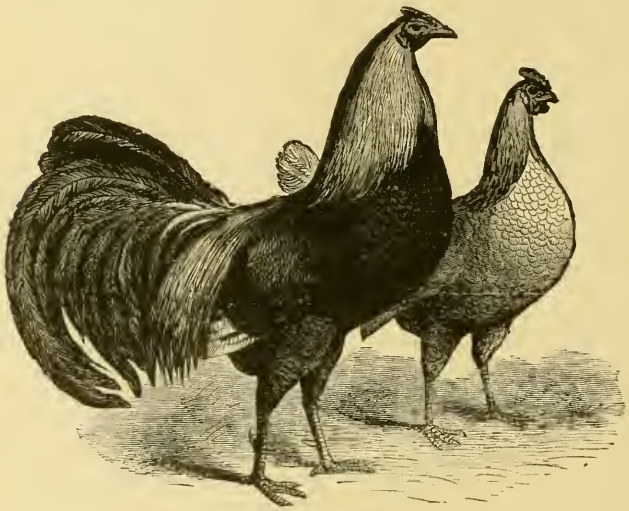
I. Game Fowls and their Varieties.

The Games are the most elegant as they are the noblest of the gallinaceous tribe. Watchful, without fear, attacking an enemy—even intruding dogs—with boldness, and fighting to the death, they at the same time are hardy, good foragers, and the hens produce eggs of the finest flavor. In fact, many fanciers breed them simply for the excellence of their eggs and the delicacy of their flesh. Public sentiment is justly against the barbarous practices of the cock-pit, in which birds are pitted against each other until one or both are killed. The varieties are numerous, and the sub-varieties are many, each having a local celebrity. As mere fighting birds, the English, Irish, Cubans, Mexicans, Spanish and Malays all have their favorites, while in many sections of the South the Georgian Games are held to be superior in point of shape, carriage, plumage, hardiness and courage, as they undoubtedly are superior in point of flesh, and the quality of the eggs. Among sub-varieties that have acquired more or less celebrity, the Salmon-pile Games, and the Dominique or Cuckoo Games may be noticed as combining many excellent qualities. Whatever breed is selected, but one variety can be kept in a run, since it would give rise to endless battles and killing of birds; besides, of all gallinaceous birds, the breeder of games should carefully keep them from intermixture.

II. Earl Derby Game.

This most excellent strain of game fowls is really the Black-Breasted red Game, but bred with the greatest care and attention for over a century in England. They are unsurpassed in style, beauty and courage, and for the table are among the best. As bred in England and in this country they are identical; they are described as having a round, well knit body, on long, strong legs, with white feet and claws; the head long, the bill lance-shaped and elegant; the face bright red, with small

comb and wattles red; they are daw-eyed, that is, the eye is gray like that of the Jackdaw; back intense brown-red; lesser wing coverts maroon colored; greater wing coverts marked at the extremity with steel-blue, forming a bar across the wings; primary wing feathers bay; tail irridescent black; hackle well feathered, touching the shoulders; wings large and well quilled; back short; breast round and black; tail long and sickled, being well tufted at the root; the carriage is upright and elegant.



EARL DERBY GAME.

Beeton, an English author describes them as follows: Head fine and tapering; face, wattles and comb bright red; extremities of upper mandible and the greater portion of the lower one white, but dusky at its base and around its nostrils; chestnut brown around the eyes, continued beneath the throat; shaft of neck hackles light buff; web pale brown edged with black; breast shaded with roan and fawn color; belly and vent of an ash tint; primary wing feathers and tail black, the latter carried vertically and widely expanded; legs, feet and nails perfectly white.

III. Brown-Breasted Red Games.

Not inferior perhaps to the foregoing in point of elegant carriage and courage are the Brown-breasted reds. Tegetmeier justly says that since they have long been sought for the pit, by men who rear them solely to this

BROWN-BREASTED RED GAME.

end, variation in shades of color is cared nothing about. Hence under the name of Brown-breasted red are included streaky-breasted, marble-breasted, and ginger-breasted reds, and various other shades of color. There is no breed of Game having so many variations in color, caused by

mating together blues, piles, duns, and brown and black-breasted reds; so that there is little uniformity of color in the strain. In the purest strain is a light streaky breasted cock, with back and shoulder coverts dark crimson; saddle red maroon on centre, passing off to a dark lemon and straw; hackle red, with the middle of each feather dark. The hen should have a nearly black body, but intermixed with gray on the wing; the hackle bright, brassy or golden.

IV. Duck-Winged Games.

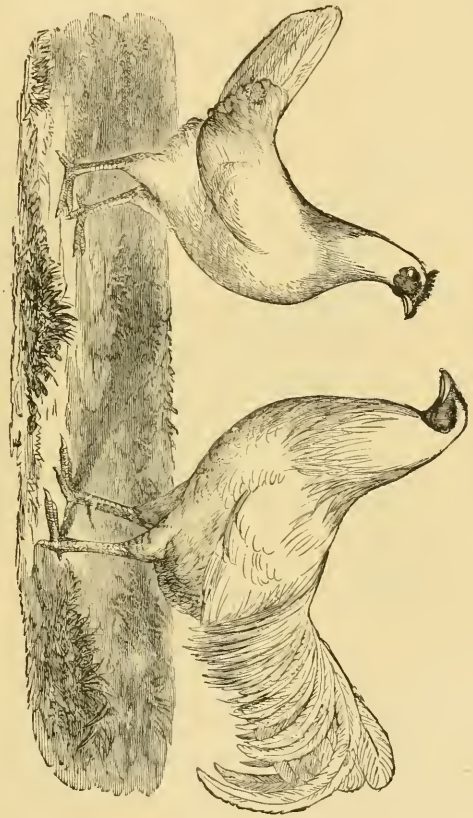
Like the Brown-breasted reds, there are several varieties of the Duck-wings. The Silver Grays are considered to be, perhaps, the purest in type; but each fancier has his own peculiar strain. Tegetmeier describes the best cocks, correct in color, as having the hackle nearly clear white, with a very slight tinge of straw color, without any decided yellow tinge or dark streak on the feather. The saddle should be as nearly as possible the color of the hackle; the breast a maroon straw; the

DUCK-WING GAME FOWLS.

shoulder coverts a rich brass or copper maroon; the breast and tail pure black. The hens to match these cocks should have their necks of a clear silver, striped with black, the silver to go right up to the comb, but being a little darker above the eyes; the back and shoulder coverts a bluish-gray, shaft of feather scarcely showing any difference from the rest of the feather, any approach to red or penciling being decidedly objectionable; the breast salmon color, of a rich shade.

V. White Georgian Games.

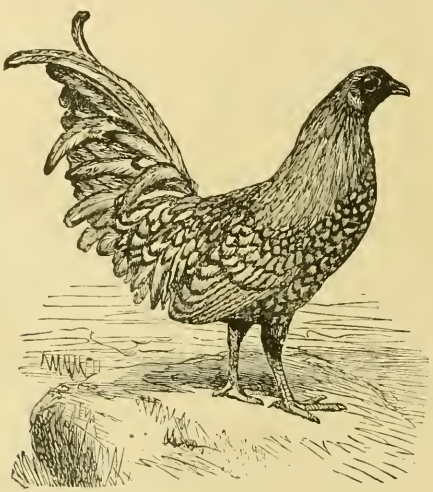
This magnificent breed of Southern games makes one of the prettiest sights we have ever seen on the lawn. Their elegant carriage, pure white color, great courage and intelligence, make them decided favorites



WHITE GEORGIAN GAMES.

wherever known. They are of European origin, like all other Games, but have been bred pure in the South, and are now, we believe, unknown in Europe except by specimens carried there. They are as good farm fowls —the eggs being delicate, the flesh excellent—as they are game in the

pit. Their characteristics are: In color they must be pure white all over, with no shade whatever on neck, breast, hock or tail. The legs may be white or yellow; and the beak should harmonize with the legs: the comb, ear lobes and wattles must be of the deepest vermilion color. The yellow beak and legs are generally preferred, since they are supposed to indicate greater hardiness; but we have never seen any difference in this respect between the white and yellow legged birds. Still, the latter will continue to be preferred for cooking, in response to a somewhat popular, but probably erroneous taste.



BARREN, FULL FEATHERED.

VI. Game Bantams.

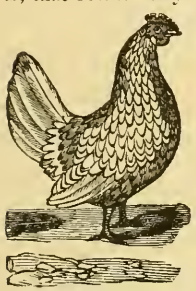
Many of the varieties of the large games have their representatives in the bantams: specimens of the game bantams are often but little larger than pigeons, but they all possess the erect carriage, wonderful courage, and brilliant plumage of their larger relations. To our mind, the Black-breasted reds combine more good qualities than any other. They may be kept in the yards with the large Asiatic breeds without any danger of intermixture, but they will nevertheless be found fully masters of the yard, and will always give due warning of danger to the flock, and assist materially in its protection from intruders. Fall broods of any of the bantams make the handsomest and smallest specimens, and show birds are usually thus bred.

VII. Other Bantams.

The principal varieties bred are the Black, the Cochin, the Feather-legged, the Nankin, the Pekin, the White, the Seabright and the Japanese. The two latter will be sufficient for notice here as being the two most distinct and elegant of all the varieties.

VIII. The Seabright Bantam.

These are of two varieties, the Golden-penciled, and the Silver-penciled, identical, except in the color of their plumage. A peculiarity of these is, that occasionally an old hen, or a barren one, will assume the plumage of the cock, a remarkable reversion. It is worthy of note, however, that the males of the Seabrights are all what are called hen-tailed breeds.



SEABRIGHT BANTAM.

The standard for the Seabrights whether Gold or Silver-penciled, is: The weight of the cock should not exceed twenty ounces at most; the hen not more than sixteen. Hens have been shown weighing not more than twelve ounces. The plumage of the Silver bantam is of a silver-white color with a jet black margin. The Golden variety is identical except that the ground color of the plumage is golden. The legs are smooth, the heads are clean, the comb double and pointed at the back, and the tail straight and without the long sickle feathers. Whether they be golden or silver spangled, the value of the birds consists in the delicacy and pencilings of the markings.

IX. Japanese Bantams.

These are without doubt the most striking of any of the varieties of bantams. Their carriage and general contour remind one of the best specimens of the white Leghorn, except that the comb of the hen is fully upright. This rare breed has a pure white body, the tail long, and the shafts of the sickle feathers white, long, upright, with the ends slightly curved, but carried over the back. The comb should be very long, broad, and moderately serrated, extending well back; the wattles long, pendant, and bright red. The legs are short and yellow; the body of the wings is white, but the quill feathers black. The hens are fan-tailed and the comb somewhat crinkled. These fowls cannot stand hard weather, and the chicks are quite tender. Hence they should not be hatched until warm weather sets in. The illustrations show perfect representations of these elegant fowls.

X. Frizzled Fowls.

Among the most curious of the gallinaceous tribe are the frizzled fowls, originally said to have been brought from Java, and occasionally found in the collections of amateur fanciers. The color should be pure white, though there are varieties bred brown and also black. Their peculiarity consists in their feathers being frizzled or rolled back. They are not useful, and their only value consists in their curious appearance.

JAPANESE BANTAM COCK.

JAPANESE BANTAM PULLET.

XI. Rumpless Fowls.

Rumpless fowls have been known for centuries at least. They were known in Virginia in the last century, and Buffon would have had the generation for whom he wrote believe, that short tails, or the want of tails was a characteristic of American animated creation; and he gravely accepted as truth that English fowls gradually lost their tails when transplanted to America. If he had been better informed he would have known that Aldrovandus described the rumpless fowls more than a hundred years before his time. It is the Persian or rumpless cock of Latham. They have been bred of various colors, including black. The most fashionable variety now is pure white, with a small single comb as shown in the illustration. Rumpless bantams have also been bred. In

fact, it would seem not difficult to breed off the tail feathers of any fowls. None of the rumpless breeds, however, have particular value except as curiosities.

RUMPLESS FOWLS.

XII. Silky Fowls.

This is also a breed more curious than useful. Its chief peculiarity is, that the feathers are filamentous and lack cohesion, giving the plumage a silky appearance. They are sometimes called negro-fowls, from the fact that the skin is of a dark violet color, or almost black, and the wattles and low, flat comb often dark purple, and covered with wart-like excrescenses. The bones are also covered with a dark membrane, so that taken altogether they may be regarded as the most singular of the

whole gallinaceous tribe. The silk fowl is a native of Asia, and the most fashionable specimens are now bred pure white. The young chickens are covered with a yellow, silky down and are most interesting. Aside from their curious appearance, they have little value.

PAIR OF SILKY FOWLS.

CHAPTER IV.

ASIATIC FOWLS.

I. THE VARIOUS ASIATIC BREEDS.——II. DARK BRAHMAS.——III. LIGHT BRAHMAS.——IV. COCHIN FOWLS.——V. GENERAL CHARACTERISTICS OF COCHINS.——VI. WHITE COCHINS.——VII. BUFF COCHINS.——VIII. PARTRIDGE COCHINS.

I. The Various Asiatic Breeds.

Of all the varieties of the large Asiatic breeds introduced into the United States, first and last, the Brahmas and the Cochin Chinas alone have held their own with other popular breeds, and have been generally disseminated. The so called Shanghai and the Chittagong—the latter confessedly the giants of the larger breeds of fowls—have not fulfilled expectations. We shall, therefore, give the Chittagong only a passing notice, and simply delineate the principal varieties of the Brahmas and the Cochins. Of the Shanghais it may be remarked, that, when first introduced, they were the largest of the fowls imported up to that time, and were of various colors, gray, buff, cinnamon-colored, partridge and black; and it is more than probable that some varieties of the Cochins owe their parentage to a union of the Shanghai and Chittagong, if indeed the so called Shanghai be not a Cochin and nothing else. However this may be, neither the Cochins nor Brahmas were originally from the Brahma-Pootra river, in India, since this region having been in the possession of the English so long, these remarkable fowls, if they had existed there, could not have remained unnoticed.

II. Dark Brahmas.

As bred both in England and America the characteristics of the dark Brahmas are as follows: The head of the cock should be surmounted with what is termed a "pea-comb." This resembles three small combs running parallel the length of the head, the centre one the highest; beak strong, well curved; wattles full; ear-lobes red, well rounded and falling below the wattles. The neck should be short, well curved; hackle full, silvery white striped with black, flowing well over the back and sides of the breast; feathers at the head should be white. Back very short, wide and flat, rising into a nice, soft, small tail, carried upright; back almost white; the saddle feathers white, striped with black,

and the longer the better. The rise from the saddle to the tail, and the side feathers of the tail to be pure lustrous green-black (except a few next the saddle), slightly tipped with white, the tail feathers pure black. The breast should be full and broad, and carried well forward; feathers black, tipped with white: wings small, and well tucked up under the saddle-feathers and thigh fluff. A good black bar across the wing is important. The fluff on the hinder parts and thighs should be black or dark gray; lower part of the thighs covered with soft feathers, nearly black. The markings of the hen are nearly similar to those of the cock. Both sexes should have rather short yellow legs and profusely feathered

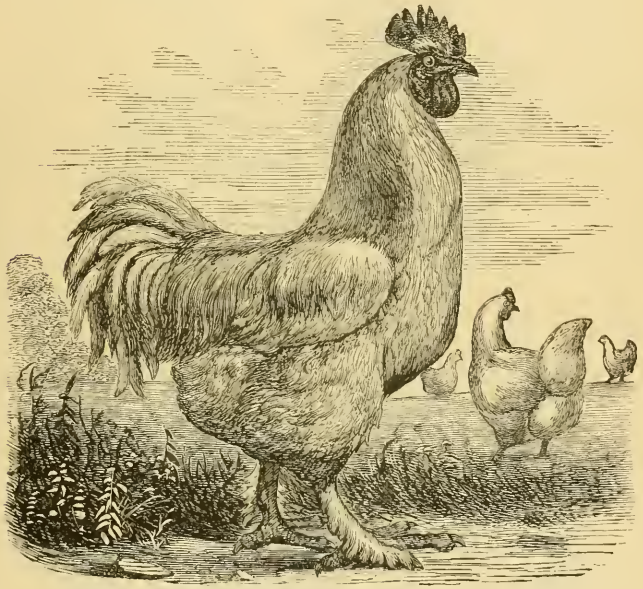
DARK AND LIGHT BRAHMAS

on the outside. The carriage of the hen is full, but not so upright as that of the cock. The markings of the hen, except the neck and tail, are the same all over, each feather having a dingy white ground, closely penciled with dark steel gray, nearly up to the throat on the breast.

III. Light Brahmas.

The best of these fowls should be mostly white in color, but if the feathers are parted, the bottom of the plumage will appear of a bluish-gray. The neck-hackles should be distinctly striped with black down the

center of each feather. The plume of the cock is often lighter than that of the hen; the back should be quite white in both sexes. The wings should appear white when folded, but the flight feathers are black; the tail black in both cock and hen; in the cock, however, it is well developed, and the coverts show splendid green reflections in the light; it should stand tolerably upright, and open well out laterally, like a fan; the legs should be yellow, and well covered with white feathers, which may or may not be very slightly mottled with black; ear-lobes must be pure red, and every bird should have a perfect pea-comb. The illustration shows both the penciled or dark and also the light Brahma.

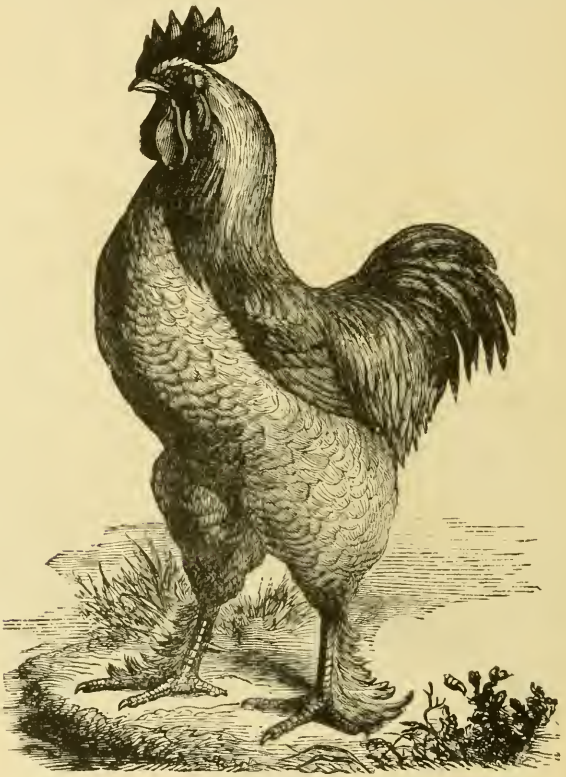


WHITE COCHIN FOWLS.

IV. Cochin Fowls.

As an indication of the steady and increasing popularity of this, the largest of valuable barn-yard fowls, it is only necessary to enumerate some of the principal varieties into which they have been broken up, according to the taste or fancy of breeders. These are, White, Buff,

Cinnamon, Grouse or Partridge Cochin, Lemon, Silver Buff, Silver Cinnamon, Black Cochin, Cuckoo, and Silky-feathered Cochin. We illustrate three of the best known breeds, the White, the Partridge and the Buff Cochin. Although among the largest of barn-yard fowls, they endure confined quarters well; but it must be remembered that even the



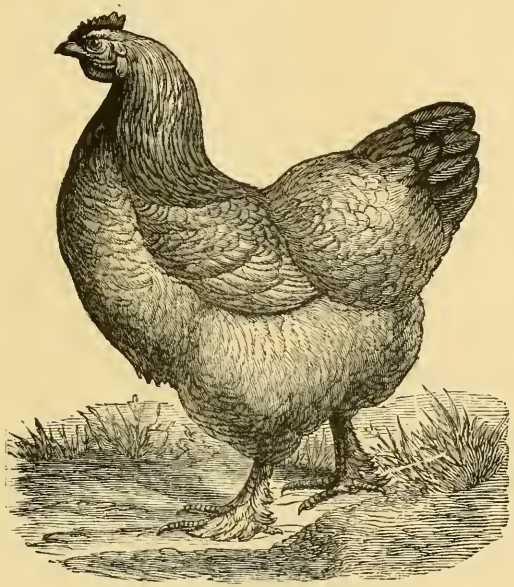
BUFF COCHIN COCK.

most domestic of fowls cannot remain healthy unless they are allowed a fair amount of exercise. Among the best of the breeds for farmers are the White Cochins, the Buff Cochins, and the Partridge or penciled Cochins. It may also be remarked that the principal objection to the Brahmas, and especially the Cochins, is that they accumulate fat so rapidly at

maturity that they are subject to apoplexy and kindred disorders. This may, however, be avoided by plenty of exercise, and a rather low diet. The engravings of Buff Cochin cock and hen show the general shape and carriage of the several sub-familes.

V. General Characteristics of Cochins.

The characteristics which will apply to the several varieties are now generally accepted to be as follows: In the cock the comb single,



BUFF COCHIN HEN.

fine, rather small, upright and straight, with well defined serrations, stout at the base and tapering to a point; head small and carried rather forward; eye bright and clear; deaf ears pendant and large; wattles large and well rounded on the lower edge; the hackles of the neck full and abundant, reaching well to the back; back broad, with a gentle rise from the middle to the tail, and with abundant saddle feathers; wings small, the primaries well doubled under the secondaries, so as to be out of sight when the wings are closed; tail small, curved feathers numerous, the

whole tail carried rather horizontally than upright; breast deep, broad and full; thighs large and strong, well covered with soft feathers; vulture hocks, those with long, stiff feathers, are objectionable; the fluff soft and abundant, well covering the thighs and standing well out behind; legs rather short, thick and bony, wide apart, and well feathered on the outside to the toes; toes stout and strong, the anterior and middle toes well feathered; the carriage not so upright as in other breeds. The hen should correspond with these points, but be more feminine in appearance; for instance, the comb should be single, very small, fine, low in front, perfectly straight with well defined serrations, and the tail, of course, lacking the sickle feathers.

VI. White Cochins.

These are sturdy, heavy birds, and among the best foragers of any of the Asiatic varieties. The standard for color, the other characteristics being as given under the general head, is: Comb, face, deaf-ear and wattles, brilliant red; plumage pure white throughout, the cock as free from yellow tinge as possible, the hens entirely free from any tinge whatever; legs bright yellow.

VII. Buff Cochin.

The points for cocks of this breed are as follows: Comb, face, deaf-ear and wattles, brilliant red; head, rich clear buff; hackle, back, wings, and saddle, rich, deep golden buff, the more uniform and even the better; quite free from mealiness on the wings; breast, thighs and fluff, uniform, clear, deep buff, as free from mottling and shading as possible; tail, rich dark chestnut, or bronze chestnut mixed with black, dark chestnut preferable; legs, bright yellow; leg feathers, clear deep buff.

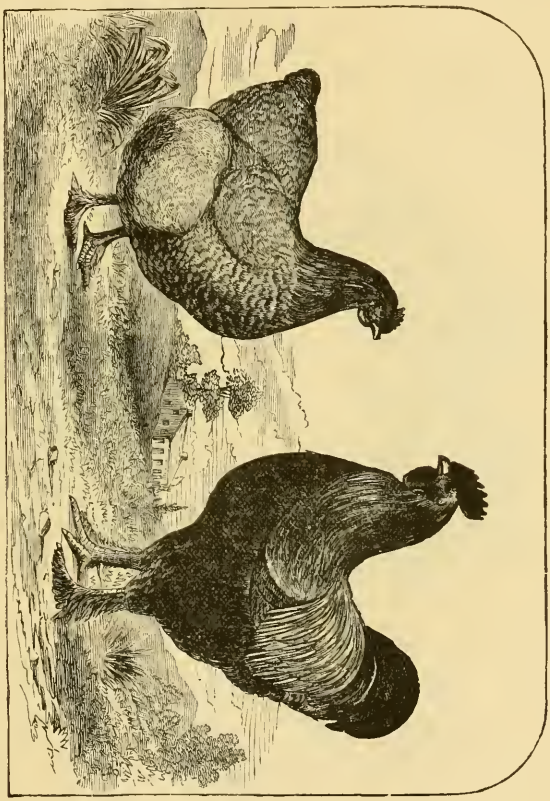
The color of the hen should be as follows: Comb, face, deaf-ear and wattles, same as cock; hackle, back, wings and saddle, same as cock, but slight marking at ends of feathers of the neck not a disqualification; legs, bright yellow, with feathers same color as those of the body.

VIII. Partridge Cochins.

The illustration will give a good idea of this magnificent breed of fowls. The points of color are:

Color of Cock.—Comb, face, deaf-ear and wattles, rich brilliant red; head, rich red; hackle, rich bright red, with a rich black stripe down the middle of each feather; back and shoulder coverts, rich dark red; wing bow, rich dark red: greater and lesser wing coverts, metallic greenish black, forming a wide bar across the wings; primary wing quills, bay on outside web, dark on inside web; secondary wing quills, rich bay on the outside web, black on the inner web, with a metallic

black end to each feather; saddle, rich bright red, with a black stripe down the middle of each feather; breast, upper part of body, and thighs, rich deep black; tail, glossy black (white at the base of the feathers objectionable, but not a disqualification.)



PARTRIDGE COCHINS.

Color of Hen.—Comb, face, deaf-ear, and wattles, brilliant red; neck, bright gold color on the edge of the feathers, with a broad black stripe down the middle; remainder of the plumage, light brown, distinctly penciled with dark brown; the penciling to reach well up the front

of the breast. The shaft of the feathers on the back, shoulder coverts, bow of the wing, and sides, creamy white; remainder of the plumage, rich brown, distinctly penciled with darker brown; the penciling reaching well up the front of the breast, and following the outline of the feathers; legs, dusky yellow, with brown feathers.

FEEDING THE PIGEONS.

CHAPTER V.

BREEDING AND MANAGEMENT OF POULTRY.

I. A STUDY OF POINTS NECESSARY.——II. EXPLANATION OF POINTS.——III. POINTS OF THE HEAD.——IV. THE PLUMAGE ILLUSTRATED AND EXPLAINED.——V. IDEAL SHAPE OF FOWLS.——VI. BREED TO A FIXED TYPE.——VII. NUMBER OF HENS TO EACH COCK.——VIII. HOW TO MATE.——IX. BREEDING UPON A MIXED FLOCK. ——X. INCUBATION OF VARIOUS FOWLS.——XI. GENERAL MANAGEMENT OF FOWLS.——XII. PROPER FOOD FOR FOWLS.——XIII. POULTRY HOUSES AND COOPS. ——XIV. FEED BOXES AND DRINKING FOUNTAINS.——XV. BREEDS FOR MARKET. ——XVI. BREEDS FOR EGGS.——XVII. HOW TO FATTEN.——XVIII. KILLING AND DRESSING FOWLS.——XIX. PACKING AND SHIPPING TO MARKET.——XX. GLOSSARY OF TERMS USED BY POULTRY FANCIERS.

I. A Study of Points Necessary.

Careful study of the points and characteristics is fully as necessary to success in the breeding of poultry as in any other department of breeding. It is not enough that you have a general idea of how fowls are to be fed and cared for; but to succeed—especially as a breeder of pure fowls—

POINTS OF POULTRY. ILLUSTRATED.

one must understand the probable results in mating fowls for a particular purpose. Not only must the contour and physical make-up be understood, but the breeder must have a knowledge of, and nice discrimination for, the various feathers, markings and characteristics, else he cannot hope

for the best success. He should also understand the technical terms used, so that he may school his mind to their exact meaning in applyig them to the fowl. The preceding illustration and references will fully explain all the points. They have been compiled from the best authorities extant, such as the writings of Tegetmeier, Wright and others.

II. Explanation of Points.

The first illustration, with lettered references, is all that will be required in learning the technical terms relating to the exterior of fowls.

Explanation.—*A*—Neck hackle. *B*—Saddle hackle. *C*—Tail. D—Breast. *E*—Upper Wing coverts. *F*. Lower Wing coverts. *G*—Primary quill. H—Thighs. I—Legs. K—Comb. L—Wattles. *M*—Ear-lobe.

III. Points of the Head.

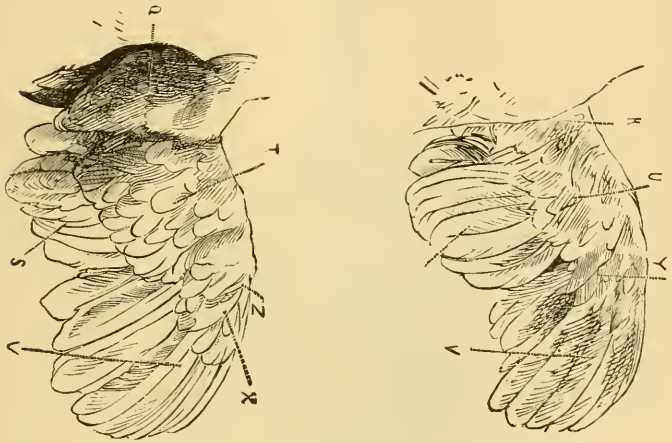
For the following analysis of the points of the head, and of the plumage, we are indebted to *Moore's Rural New Yorker*. The cut will explain the precise situation of the several parts of the head.

POINTS OF THE HEAD OF COCK.

Explanation.—1—The comb, which surmounts the skull. 2—The wattles which hang underneath and on each side of the beak. 3—The ear wattles, which hang under the cheek. 4—The tufts of little feathers which cover and protect the auditory organ. 5—The cheeks which commence at the beginning near the nostrils, cover all the face and re-unite behind the head by a continuation of the flesh of the same nature, but

covered with feathers. 6—The nostrils which are at the beginning of the beak. 7—The beak, of which the two parts, the upper and lower mandible, are horny.

The head of the cock, as of the hen, is composed of two principal parts: 1st, the skull is a firm union of bones, which include the upper part, or mandible, of the beak; 2nd, the lower part or mandible of the beak, being the lower jaw-bone, formed by a single piece. In the skull are the sockets or cavities which contain the eye; the nostrils are in front of the eye; the auditory organ, or ear, is behind the eye. The head, excepting the beak, is entirely covered by a fleshy covering, round which may be seen several appendages or caruncles, which are the crest, the two ear-



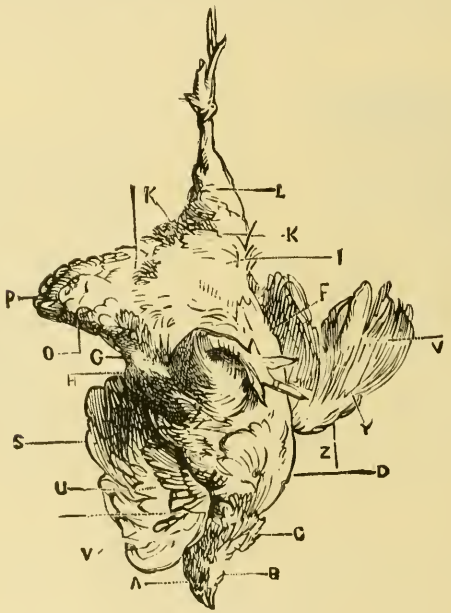
OUTER AND INNER WING PLUMAGE. (See Article IV.)

lobes, and the two ear-wattles. This covering forms the cheeks. The color, the size, the form of each of these parts is varied according to the variety, and often serves to characterize each. A tuft of short feathers called "the tuft" covers the ear.

The comb is straight or drooping; it is single when it is composed of only one piece, double when there are two alike united or near together, it is triple when it is formed of two alike and one in the middle; it is frizzled when full of granulations more or less deep, and erect excrescences; it is a crown when it is circular, hollow, and indented; it is goblet shaped when hollow, vascular, and not indented. There are other forms but they are composed of parts or unions of those particularized.

IV. The Plumage Illustrated and Explained.

With the hen there may be three kinds of feathers distinguished: 1. The large feathers on the wings for flying, and on the rump to form the tail; 2. the middle-sized feathers which cover the large feathers, and are also found on the wing and rump; 3. the neck, the back, the sides, the throat, the shoulders, and a part of the wings. They are always in layers compactly covering those beneath them like tiles. We shall designate them by the name of the places they occupy, and refer to the engravings to render them easy to recognize:



POINTS OF THE FOWL.

Explanation—*A*—The upper feathers of the head are small in those fowls not tufted. They surround the skull.

B—The under feathers of the head are almost like bristles. They cover the cheeks in the space which separates on the wattles.

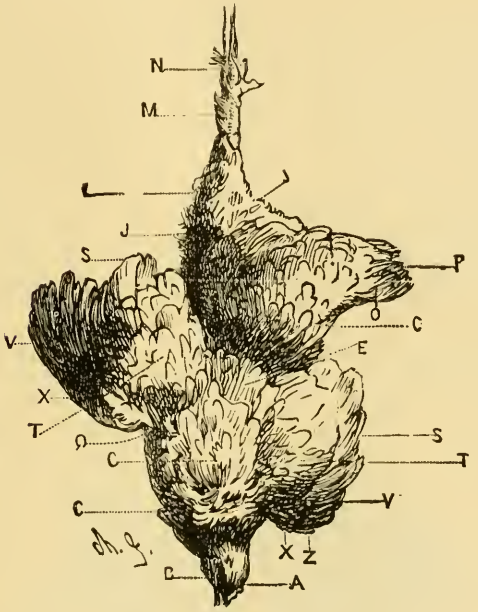
C—The upper feathers of those at the back of the neck are short, and lengthening lower down, forming what is called the hackle. They become longer between the shoulders when they cover the beginning of those on the back and the commencement of the wings.

D—The feathers of the back, forming a layer about 10. These feathers are of the same nature as those of the neck, but a little larger, and form the saddle.

F—The feathers of the breast cover the entire length of the two breast muscles extending beyond the breast-bone at each side and uniting at its end. The whole forms what is termed the breast. These feathers, with the feathers of the loins, overlap those of the sides.

G—The feathers on the sides cover the loins, taking in the back as far as the rump, which they go beyond and cover the lower part of the feathers of the tail. They also cover the commencement of the feathers of the flanks, thighs and abdomen.

H—The feathers of the flanks are light and fluffy. They cover the upper part of the thigh feathers and slip under those of the breast.



SHOWING POINTS.

I—The feathers of the abdomen cover and envelop all this part from the end of the breast to the rump. These feathers are generally fluffy, of a silky nature and spread out in a tuft.

J—The outside feathers of the thigh cover those of the abdomen and leg.

L—The outside and inside feathers of the leg stop at the heel, or in some varieties they proceed lower and form what are called ruffles or vulture hocks.

M—The feathers of the feet or sole are long, short, or entirely absent, in the different varieties. These feathers are along the shank either in one or several rows. They are always on the outside part.

N—The feathers of the toes appear on the outsides.

O—The middle tail feathers envelop the rump and cover the bases of the large feathers of the tail.

P—The larger tail feathers are in a regular line of seven on each side of the rump, and form the tail.

Q—The outside feathers of the shoulders cover a part of the other feathers of the wing. They form the shoulder.

R—The inside feathers of the shoulders are small, thin, and slender.

S—The larger feathers of the pinion form, when the wing is opened, a large, arched surface, and are of different sizes. These feathers grow out of the under side of the pinion.

T—The small outside feathers of the pinion are of different sizes. They come on all the outside surfaces from the shoulder to the pinion. They begin quite small on the outside edge, and finish a medium size on the inside edge.

U—The inside feathers of the pinion are close, middle-sized, and small, covering the bases of the large feathers of the pinion.

V—The large flight-feathers, or feathers of the hand, are large and strong, and are of most use to the bird in locomotion. They begin at the under edge of that which is called the top of the wing.

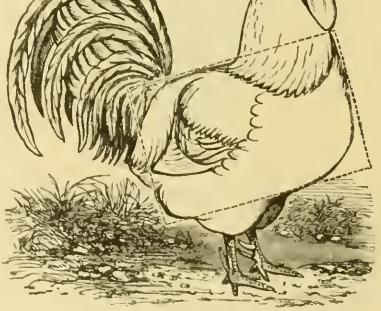
X—The outside flight-feathers cover the large ones; they are stiff and well flattened on the others.

Y—The inside flight-feathers are, some small and others medium-sized; cover the bases of the flight-feathers.

Z—An appendix called the pommel of the wing, which represents the fingered part. It is at the joint of the pinion and has some middle-sized feathers of the same description as the large pinion feathers, and have some small ones to cover them. These feathers assist the flight.

V. Ideal Shape of Fowls.

The Dorking fowl may be taken as the embodiment of as much excellence in the same compass as can be found in any other breed. Hence



IDEAL SHAPE OF FOWL.

we give an illustration of the Dorking, figured to represent the ideal shape of the barn-yard fowl.

VI. Breed to a Fixed Type.

In breeding fowls, always avoid violent crosses. Disparity of form in mating birds can only end in disaster through the cropping out of undue form, and especially by bad effects in the feathering, even after the lapse of many years. The same general rule should be borne in mind that we have stated in previous chapters on breeding live stock: avoid crosses as much as possible, and breed pure when it is possible to do so.

VI. Number of Hens to Each Cock.

The number of cocks to be kept according to the hens will vary with different breeds. One cock to eight or ten hens is sufficient in any breed. This will be the right number for Games, Dorkings, and French fowls; with Spanish Brahmas or Cochins two more hens may be allowed. One Hamburg cock will generally serve for twelve to fourteen hens. When several males are kept, it is better to keep all but one or two of them confined, allowing them to take turns with the flock, since this prevents worrying the hens and ensures better service. When the raising of chickens is alone concerned, it is better to have plenty of males, to ensure fertility. When only eggs are wanted for market, as many will be laid whether properly fertilized or not.

VIII. How to Mate Fowls.

From the age of one to four years is the best time for laying. Hens two years old and over make the best sitting hens. Avoid vulture hocks (feathers running down at the hocks as in vultures) in all fowls, and

PROTECTING HER BROOD

especially in the Asiatic breeds. In breeding Asiatic fowls, let the males be as full-colored as possible, since the tendency of these fowls is to breed to lighter colors; but judgment must be used not to get too violent

contrast in the sexes. So, if the hen is long-backed select a short-backed cock, but if the hen is short-backed, never breed to a long-backed cock; you cannot well have the back too short. In breeding to color, all self-colors should be as solid as possible, and in parti-colored fowls study the birds for mating carefully, so that you may breed as near to a feather as possible, according to the characteristics of the breed. As a rule, heavily penciled males will get heavily penciled chicks, but if the saddle is very heavily striped, or the neck hackle very dark, the chicks will incline to be spotted; but cocks with dark hackles, and hens with hackles lightly penciled will produce chickens delicately penciled.

IX. Breeding upon a Mixed Flock.

If you cannot afford pure-bred stock, buy a sufficient number of cocks for your hens, or select a dozen hens and mate them with a good cock, from which to raise chickens. Once you begin, stick always to the same strain, and in three years you will have a strain of fowls—if you have carefully selected the chicks, always using pure males—good enough for market purposes and eggs. In the meantime, get a clutch of eggs from pure fowls and breed them separate from the others, and soon you will have the pure breed also. There is no farm stock that it pays better to breed pure than poultry, whether they be land or water fowl.

X. Incubation of Various Fowls.

The following table will show at a glance all necessary information in relation to the incubation of various fowls.

NAME OF BIRD.	PERIOD OF INCUBATION.		
	SHORTEST PERIOD.	MEAN PERIOD.	LONGEST PERIOD.
Turkey, sitting on the eggs of the Hen	17	24	28
Turkey, sitting on the eggs of the Duck	24	27	30
Turkey, sitting on the eggs of the Turkey	24	26	30
Hen sitting on the eggs of the Duck	26	30	34
Hen sitting on the eggs of the Hen	19	21	24
Duck	28	30	32
Goose	27	30	33
Pigeon	16	18	20

XI. General Management of Fowls.

In order to raise poultry successfully, proper buildings and plenty of range must be provided. The buildings need not be expensive, and on the

farm any warm out house will afford comfortable quarters, and range enough is provided in the out fields. On the farm in summer fowls will pick up a good share of their living, insects chiefly, and thus, while partly supporting themselves, they are at the same time profiting their owner by the destruction of insect pests. In fact, fowls, if allowed, will wander considerable distances in search of food, as illustrated in the cut "Foraging for themselves." Those who keep fowls in villages and suburban places, must provide animal food and also green vegetable food in addition to the grain fed. This, with comfortable quarters, care in feeding, and due attention to the health of the birds, constitute about all there is practically in poultry raising, except that pure breeds are kept with a view to the rearing of very superior birds. In the latter case a more careful study of the anatomy, physiology, and points of fowls must be made as in breeding any other animals.

FORAGING FOR THEMSELVES.

XII. Proper Food of Fowls.

Fowls need a variety of food; they are nearly omniverous feeders. Animal food is essential, but the bulk of the feeding may be grain, either raw or ground. If mixed feed (ground grain) is used, have the dough so stiff that it will not run: never feed sloppy food. Indian meal and potatoes boiled and mashed together, so stiff that the dough clings when squeezed in the hand, is one of the best of foods. Feed on clean ground —never in a trough in summer, since moist food so fed will inevitably become sour, and the troughs are seldom properly cleaned. In winter, ground feed should be fed as hot as the hens can eat it, and a little chopped onion mixed in is excellent; provide other green food also, as cabbage leaves. For animal food, a sheep's pluck, hung so high that the fowls can just reach it, is excellent; so are the greaves from trying establishments. To keep the hens in good laying condition, they must have animal food, and also bones broken so fine that they may be easily swallowed. Very little meat, however, is necessary, for if too much is fed the fowls may lose their feathers. Whole grain, and the drinking water should be kept in some receptacle, so the fowls may take it at pleasure. The grain fed may be screenings from wheat, rye, buckwheat and oats.

XIII. Poultry Houses and Coops.

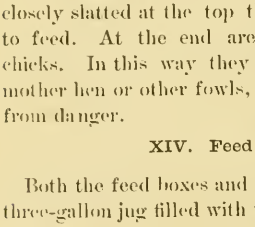
Poultry houses, however simple, should be both warm in winter and well lighted. The side containing the glass should face the South for the

advantage of the sun's warmth in winter. The windows should also be provided with iron netting, so the sash may be raised to admit air in summer, and also in mild weather in winter. One portion should be half-dark, for the laying and sitting hens, and a proper dust bath must also be provided. Have the perches not more than two feet from the floor in the roosting place, and all on one level: let them be large. A two by four scantling, well rounded and set on edge, is not too large for heavy birds. The whole house should be whitewashed once a month in summer, and kept scrupulously clean at all times. If lice make their appearance, fumigate thoroughly, and after cleansing, whitewash with lime to which a little carbolic acid is added. Sprinkle Scotch snuff among the feathers on the backs of the fowls, and give fresh materials for dust bath.

The proper coops for hens with young chickens will readily suggest themselves. A barrel with one head out, laid on its side, and with stakes driven along one end to admit the passage of the chicks is a good makeshift. The ordinary triangular coop is well known. The best coop is a square box 18 by 24 inches, and roofed to shed rain; from the open end of this a runway is thrown nine inches high and as wide as the coop, so closely slatted at the top that old fowls cannot get their heads through to feed. At the end are orifices to give egress and ingress to the chicks. In this way they may be fed without interference from the mother hen or other fowls, and it also furnishes a safe place of refuge from danger.

XIV. Feed Boxes and Drinking Fountains.

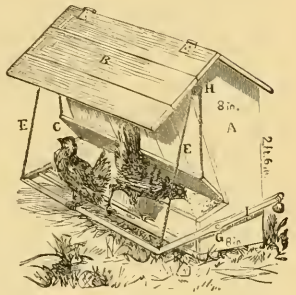
Both the feed boxes and drinking fountains should be self-feeding. A three-gallon jug filled with water, and turned mouth down in a suitable dish, and properly supported, makes a tolerable drinking fountain, and will suffice to convey the idea. For a larger number of fowls, a five or six gallon keg, with a faucet with a long spout to rest near the bottom of the drinking trough is good. If filled, bunged tight, and the faucet opened, just enough water will be given up to keep the supply in the trough at a uniform height.



A GOOD FORM OF FOUNTAIN.

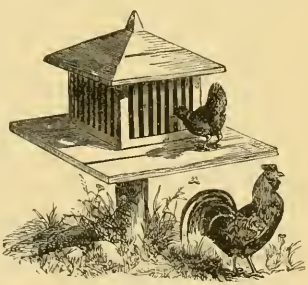
Feed boxes are made on the same general principle, a box narrowing to the bottom, and with an orifice large enough to allow a free flow of grain, and resting near enough the bottom of the feeding box so that but little will be given down at a time. Slats sufficiently wide apart so the fowls can feed through them, also keep the poultry from wasting the grain.

A Perfect Hopper.—The best form of feeding hopper is shown in the annexed cut; it can readily be constructed by any person by aid of the following description with references: *A*—An end view, eight inches wide and two feet six inches high. *B*—The roof, three feet long, projecting over the perch on which the fowls stand while feeding. *C*—The lid of receiving manger raised, exhibiting the grain. *E,E*—Cords attached to the perch and lid of manger or feeding trough. *I*—End bar of perch, with a weight attached to the end to balance the lid, otherwise it would not close when the fowls leave the perch. *H*—Pulley. *G*—Fulcrum. The hinges at the ridge are for raising the top when the hopper is to be replenished. When a fowl desires food, it hops upon the bars of the perch and the weight of the fowl raises the lid of the feed box, exposing the grain to view, and after satisfying its hunger jumps off and the lid closes. Of course the dimensions can be increased as desired.



A PERFECT FEEDING HOPPER.

A Rat-Proof Hopper.—A stool hopper—as shown in the annexed cut—inaccessible to rats may be built by the following directions: Make a platform two or three feet square, as the case may be; then make a square box, three inches high and sixteen inches square: nail it in the center of the platform; saw strips one and a quarter inch square and eighteen inches high for the posts: nail strips of boards, two inches wide, to the posts at the top to secure and steady them; then take common lath or any thin stuff, one and a half or two inches wide, and nail them to the top and bottom, up and down, leaving spaces of two inches between the slats, so that the fowls can get at the feed. The roof may be four-square, as shown in the cut, and detached so that it can be raised for the hopper to be replenished with grain. Elevate the hopper on a post about three feet from the ground, as shown in the cut, which makes it rat and mice proof. The fowls will soon learn to leap upon the platform and feed from the grain box between the slats.


A STOOL FEEDING HOPPER.

XV. Breeds for Market.

The Dorkings are superior table fowls; they are, however, rather tender and hard to rear, and have not gained special favor in the United States. The Dominiques are hardy, good layers, and good table fowls; the Plymouth Rocks are larger, and perhaps better if you have the stock. A Dominique cross on Brahmas or Cochin Chinas, will give chicks that grow fast, feather well, and make plump fowls. A Dorking cross on the large Asiatic breeds, is regarded in England as excellent. All things considered, we think the Brahmas and the Cochins will give the best results, and the Brahmas especially are good winter layers. In this, however, every breeder will have his own fancy. The Houdans and La Fleche are in good repute among breeders, but the price of the original stock must, of course, be taken into consideration.

XVI. Breeds for Eggs.

As laying fowls simply, we have found the Polands all that could be desired. The Leghorns, Houdans, Hamburgs and Black Spanish are fully as good layers, and all of them are non-sitters; but the Leghorns and the Hamburgs have the reputation of being tender, and the Spanish are decidedly so. The Houdan and La Fleche have hardly been tried sufficiently in this country to warrant a decided opinion as to their true value.

XVII. How to Fatten.

The fattening of poultry, if they are in good flesh to start with, does not take long. In fact the bulk of the chickens marketed are taken direct from the yards without extra feeding. This is bad economy. Fifteen to twenty days' feeding, if they are confined in a dark place, will render them fat. When fat, market immediately, since they will soon begin to shrink. Market when they cease to feed full. Corn meal, made into a thick mush, with as much additional meal as can be worked in while boiling hot, and allowed to cool, is the best feed. Put the fowls in coops so small that they cannot turn round, and feed three times a day, allowing to take what water—skimmed milk is better—and clean gravel they will. The last week omit the gravel, and keep the pens clean and well littered with straw all the time.

XVIII. Killing and Dressing.

Let the fowl fast at least twelve hours before killing. No man ever made money by selling a fowl with half a pint of raw corn stuffed in the crop. Tie the legs of the fowl together, hang it up, open the beak, pass a sharp thin-bladed knife, into the mouth and up into the roof,

dividing the membrane; thus the bird is killed instantly. Then deftly cut the throat and let it bleed. The nicest way to pick, is without scalding and while the bird is quite warm. It may be easily done and the bird not torn; thus dressed it will bring enough more in a city market to pay the extra trouble.

To Scald a Fowl.—A well known buyer and dresser for the Chicago market, in answer to the question, how to dress and pack, gave the writer the following information which is here reproduced:

Have the water just scalding hot—*not boiling*—190 degrees is just right. Immerse the fowl, holding it by the legs, taking it out and in, until the feathers slip easily. Persons become very expert at this, the feathers coming away by brushing them with the hand, apparently. At all events, they must be picked clean. Hang turkeys and chickens by the feet, and ducks and geese by the head to cool. Under *no* circumstances whatever, should ducks and geese be scalded; they must invariably be picked dry. Take off the heads of the chickens as soon as picked, tie the skin neatly over the stump, draw out the insides carefully, and hang up to cool. Never sell fowls undrawn. They will bring enough more drawn and nicely packed, with the heart, gizzard and liver placed inside each fowl, to pay for the trouble. Let them get thoroughly cool—as cold as possible—but never, under any circumstances, frozen. There is always money in properly prepared poultry; the money is lost in half fitting them for market, the fowls often being forwarded in a most disgusting state. There is money in the production of eggs; there is money in raising poultry for the market. The money is lost in improper packing, and in a foolish attempt, occasionally made, to make the buyer pay for a crop full of musty corn, at the price of first-class meat.

XIX. Packing and Shipping to Market.

The poultry, having been killed as directed, carefully picked, the heads cut off, and the skin drawn over the stump and neatly tied—or if preferred, leave the head on, the fowl will not bring less for it—and the birds chilled down to as near the freezing point as possible, provide clean boxes and place a layer of clean hay or straw quite free from dust, in the bottom. Pick up a fowl, bend the head under and to one side of the breast bone, and lay it down flat on its breast, back up, the legs extending straight out behind. The first fowl to be laid in the left hand corner. So placed, lay a row across the box to the right, and pack close, row by row, until only one row is left, then reverse the heads, laying them next the other end of the box, the feet under the previous row of heads. If there is a space left between the two last rows, put in what birds will fit sideways. If not, pack in clean, long straw, and also pack in straw at the

sides and between the birds, so they cannot move. Pack straw enough over one layer of fowls, so that the others cannot touch, and so proceed until the box is full. Fill the box full. There must never be any shaking, or else the birds will become bruised, and loss will ensue. Many packers of extra poultry place paper over and under each layer before filling in the straw. There is no doubt but that it pays. Nail the box tight; mark the initials of the packer, the number of fowls and variety, and mark plainly the full name of the person or firm to whom it is consigned, with street and number on the box. Thus the receiver will know at a glance what the box contains, and does not have to unpack to find out.

XX. Glossary of Terms Used by Poultry Fanciers.

Beard.—A bunch of feathers under the throat of some breeds, as Houdans or Polish.

Breed.—Any variety of fowl presenting distinct characteristics.

Brood.—Family of young chickens.

Broody.—Desiring to sit.

Carriage.—The attitude or bearing of a bird.

Caruncalated.—Covered with fleshy protuberances, as on the neck of a turkey-cock.

Chick.—A newly-hatched fowl, until a few weeks old.

Chicken.—Applied to indefinite ages until twelve months old.

Clutch.—Given to the batch of eggs under a sitting hen, also to brood of chickens hatched therefrom.

Cockerel.—A young cock.

Comb.—The red protuberance on top of the fowl's head.

Condition.—The state of the fowl as regards health, beauty of plumage—the latter especially.

Crest.—A tuft of feathers on the head; the top-knot.

Crop.—The receptacle for food before digestion.

Cushion.—The mass of feathers over the tail and end of the hen's back, covering the tail; chiefly developed in Cochins.

Deaf-ears.—Folds of skin hanging from the true ears, varying in color, being blue, white, cream-colored, or red.

Dubbing.—Cutting off the comb, wattles, &c., leaving the head smooth.

Ear-lobes.—Same as deaf-ears.

Face.—The bare skin around the eye.

Flights.—The primary wing feathers, used in flying, but unseen when at rest.

Fluffs.—Soft, downy feathers about the thighs.

Furnished.—Assumed full character. When a cockerel obtains his tail, comb, &c.

Gills.—A term applied to the wattles, sometimes more indefinitely to the whole region of the throat.

Hackles.—The peculiar narrow feathers on the fowl's neck.

Hen-feathered, or *Henny.*—Resembling a hen, in the absence of sickles.

Hock.—The elbow-joint of the leg.

Keel.—A word sometimes used to denote the breast bone.

Leg.—The scaly part, or shank.

Leg-feathers.—The feathers on the outside of the shank.

Mossy.—Confused in marking.

Pea-comb.—A triple comb.

Penciling.—Small stripes over a feather.

Poult.—A young turkey.

Primaries.—The flight-feathers of the wings, hidden when the wing is closed.

Pullet.—A young hen.

Rooster.—The common term for the male bird.

Saddle.—The posterior of the back, reaching to the tail in a cock, answering to the cushion in a hen.

Secondaries.—The wing quill-feathers, which show when the bird is at rest.

Self-color.—A uniform tint over the feathers.

Shaft.—The stem of a feather.

Shank.—The scaly part of the leg.

Sickles.—The top curved feathers of a cock's tail.

Spangling.—The marking produced by each feather having one large spot of some color different to the ground.

Spur.—The sharp weapon on the heel of a cock.

Stag.—Another term for a young cock.

Strain.—A race of fowls, having acquired an individual character of its own, by being bred for years by one breeder or his successors.

Symmetry.—Perfection of proportion.

Tail-coverts.—The soft, glossy, curved feathers at the sides of the bottom of the tail.

Tail-feathers.—Applied to the straight, stiff feathers of the tail only.

Thighs.—The joint above the shanks.

Top-knot.—Same as crest.

Trio.—A cock and two hens.

Under-color.—The color of the plumage as seen when the surface is lifted.

Vulture-hock.—Stiff projecting feathers at the hock-joint.

Wattles.—The red depending structures at each side of the base of the beak.

Web.—Expressing a flat and thin structure. The web of a feather is the flat or plume portion; the web of the foot, the flat skin between the toes; of the wing, the triangular skin, seen when the member is extended.

Wing-bar.—Any line of dark color across the middle of the wing.

Wing-bow.—The upper or shoulder part of the wing.

Wing-butts—The corners or ends of the wing. Game fanciers denote the upper ends as shoulder-butts; the lower as lower-butts.

Wing-coverts.—The broad feathers covering the roots of the secondary quills.

CHAPTER VI.

THE TURKEY, AND ITS VARIETIES.

I. VARIETIES OF THE DOMESTIC TURKEY.——II. THE BRONZED-BLACK TURKEY.——III. THE COMMON TURKEY.——IV. THE OCELLATED TURKEY.——V. ENGLISH TURKEYS.——VI. RARE VARIETIES.——VII. THE CARE OF TURKEYS.

I. Varieties of the Domestic Turkey.

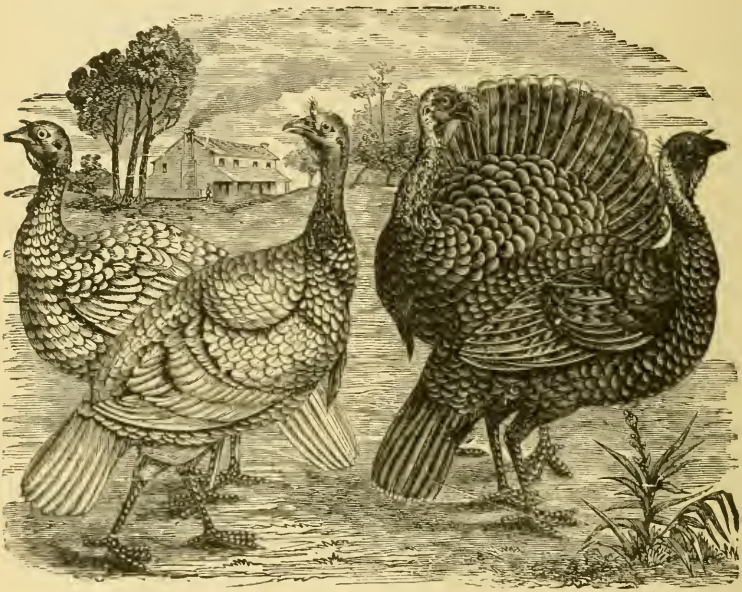
Notwithstanding the length of time that the wild turkey has been domesticated—over 300 years—it still retains some of its wild habits, even under the most artificial conditions. This is undoubtedly due to the fact that the turkey endures close confinement to a less extent than any of the domestic land birds, and hence these traits of wildness, wandering and the hiding of nests and young, have not been entirely bred out. The same is true of the pheasants, still less domesticated, although they have been in more or less subjection to man since ancient times.

All turkeys, whether of the wild or domestic varieties, breed freely, one with the other, and continue fertile, thus proving conclusively that they came originally from one species. They are now broken up into every color, black-bronzed and white-mottled being the original wild color. Among the sub-species, are: The Common turkey; Black-and-white-mottled; Black-bronzed; the Mexican; the Ocellated or Honduras; the White; the Buff; the Fawn-colored; the Copper-colored, and the Parti-colored. Temminck, in 1813 described Isabelle yellow turkeys, with fine full crests of pure white. Lieutenant Byam described crested wild turkeys as seen by him in Mexico; it is probable that this observer mistook curassows for turkeys, since this bird is domesticated there and nobody else has found crested turkeys in Mexico.

II. The Bronzed-Black Turkey.

This variety is said to have been produced by a cross of the Wild turkey upon the Common turkey hen, the produce fixed and improved by careful selection and breeding. They are the largest, as they are undoubtedly the best, of the domestic varieties. The average for mature birds, well fattened, is about thirty pounds, while forty pounds is not uncommon for extra male birds. The hens will weigh from twenty to twenty-five pounds each, when mature. They are as hardy as they are beautiful in plumage.

The best specimens are described as follows: In the cock, the face, ear-lobes, wattles and jaws are deep rich red, the wattles warted and sometimes edged white, the bill curved, strong, of a light horn color at the tip and dark at the base. The neck, breast and back black, shaded with bronze, which in the sunlight glistens golden, each feather ending in a narrow glossy black band extending clear across. The under part of the body is similarly marked, but more subdued. The wing-bow is

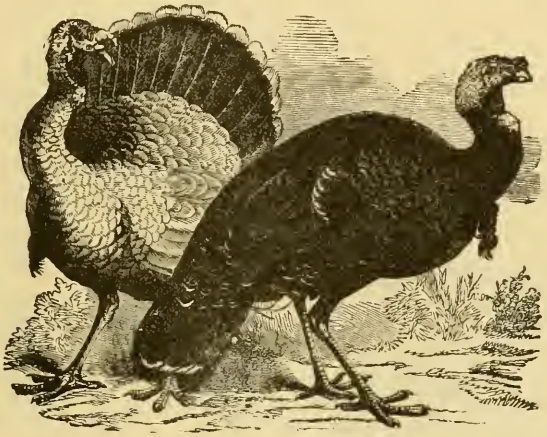


BRONZE TURKEYS.

black, showing a brilliant greenish or brown lustre, the flight-feathers black, barred across with white or gray, even and regular; the wing-coverts rich bronze, the end of each feather terminating in a wide black band, giving the wings, when folded, a broad bronze band across each; tail black, each feather irregularly penciled with a narrow brown band, and ending in a grayish-bronze band. Fluff abundant and soft; legs long, strong, dark or nearly black. The hen is similarly colored, but more subdued.

III. The Common Turkey.

The common turkey is white and black mottled, having the head and wattle of the wild turkey. They are of medium size, and, probably from the fact that they have been more generally disseminated and longer domesticated than the other varieties, they are less inclined to wander.



THE COMMON TURKEY.

When simply dollars and cents are concerned, they are the most profitable to breed, since they are hardy, of medium size, and mature early. They will weigh, fat, at eight months old, from eleven to twelve pounds, and, when fully grown, sixteen pounds.

IV. The Ocellated Turkey.

This is one of the most elegant of the whole genus; it is a native of Central America, and is found wild all over that region. It breeds kindly with our domestic turkey, and the progeny remains quite fertile, but both the true and cross breed are too tender for the North. Our bronzed green and gold turkeys undoubtedly owe their markings to this variety. The ground color of the plumage of the Honduras, or Ocellated turkey, is bronzed-green, banded with gold-bronze and shining black; lower down the back the color is deep blue and red; upon the tail the bands become fully defined and sharp, producing the peculiar ocellated or eye-like ap-

pearance, whence their name. The wattle is also peculiar, and the top of the head is covered with wart-like protuberances, as shown in the cut of a young Ocellated hen.

YOUNG OCELLATED TURKEY HEN.

V. English Turkeys.

The so-called English turkey is simply a sub-variety of the common American domesticated turkey already described. Careful breeding and selection have increased the size and rendered them quite uniform in color. One sub-variety is the Norfolk turkey, black with a few white spots on the wings. Another sub-variety, valued in Cambridgeshire, is bronze-gray, and longer-legged than the Norfolk; these, however, vary from a light copper color to dark, the latter being preferred.

VI. Rare Varieties.

There are a number of more or less rare varieties of turkeys, the Buff, the Fawn, and the Pure-white being the principal ones. They are all considered more tender than the varieties heretofore named. Turkeys of the white variety are especially handsome, the color being relieved by the tuft on the breast, which remains jet black, which, with the blue-white and red caruncles of the head and neck, present a most elegant appearance.

VII. The Care of Turkeys.

Turkeys will bear confinement less than any of our domestic fowls, if we except the peacock, and perhaps the Guinea-fowl. They must have plenty of range, and will not roost under shelter, unless compelled to do so, even in the winter. Their favorite resort is a high, bushy tree, just as the peacock favors the highest peak of the house and barn. An eccentric fancier was not much out of the way who said the three best house guards are turkeys, peafowl and geese. The two first see everything, and the latter hear everything, and, he quaintly added, their clatter quickly arouses the "noble watch dog," who, awakened from a sound sleep, contributes his bark, and gets the credit of the whole alarm.

When full grown, turkeys are hardy, and fully able to take care of themselves. The young chicks, however, are quite tender, up to the age of four weeks, and again about the time they begin to acquire the red head, which occurs at six or seven weeks old. During this time they should be protected from hot suns, heavy rains, and the night dews. For the first two weeks, hard boiled yolk of eggs rubbed up with oat meal or cornmeal makes the best feed. After this, cracked wheat, oatmeal grits and cracked corn should form the staple of the feed, and if a little bruised hempseed is added until the chicks are two months old, they will thereafter pretty much forage for themselves, except for their daily feed of whole grain. Young onions chopped fine and mixed with their feed should be given pretty often. The curd of sour milk is also excellent for them. In fattening, cornmeal, cooked to a hard mush, is the usual feed, and if to this be added what skimmed milk they will drink once a day, with plenty of pure water at other times, they may be fattened to heavy weights.

WATER FOWL.

CHAPTER VII.

GEESE AND THEIR VARIETIES.

I. THE MANAGEMENT OF GEESE.——II. EMBDEN OR BREMEN GEESE.——III. TOULOUSE GEESE.——IV. WHITE CHINESE GEESE.——V. HONG KONG GEESE.——VI. THE AFRICAN GOOSE.——VII. THE CANADA OR WILD GOOSE.——VIII. EGYPTIAN GEESE.

I. The Management of Geese.

The management of geese is very simple. A good dry spot for their resting place, plenty of range, with young grass, and a pond, or running water, if possible, will enable any one to raise geese successfully, if plenty of grain, corn and wheat screenings are given to make up what they fail to get in their rambles. The grain fed should always be given in a deep vessel of water in summer, if deep natural water is not near, since geese are often annoyed by insects getting in the ears and nostrils, which they rid themselves of by thrusting their heads well down into water.

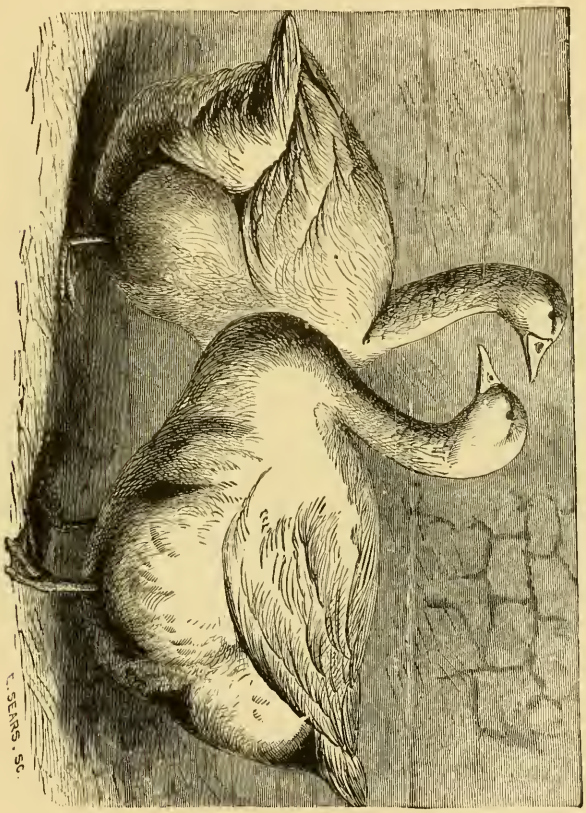
In fattening for market, corn-meal and potatoes boiled together to a thick mush, is as good as anything. They should be sold as soon as fat, which should be in about two weeks of feeding. If the mush is made with skimmed milk the geese will become very fat, if given as much as they will eat three times a day.

Geese are subject to but few diseases. For diarrhœa, give one or two drops of laudanum in a little water, and repeat if necessary. For giddiness bleed them in the prominent vein which separates the claw. Geese live to a great age, and old geese are the best mothers. Ganders, however, are best at from one to three years old, since as they get age they are apt to become cross, and sometimes injure small children.

II. Embden or Bremen Geese.

There is no doubt but the Embden is the most valuable of the domesticated varieties of geese. They should be pure white, with prominent blue eyes; strong, medium-length neck; heavy bodies, with the feathers

rather more inclined to curl from the shoulder to the head, than in other varieties; the bill is dark flesh color and the legs orange. Young birds of the year have been made to weigh over forty pounds, and mature birds

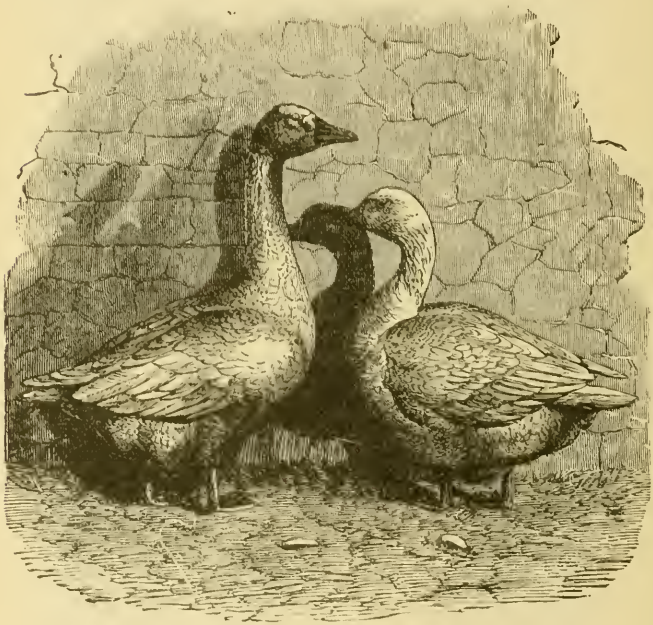


EMBDEN GEESE.

near sixty pounds. The average for breeding birds may be put at about twenty pounds. They are early layers and may be made to rear two broods in a season.

III. Toulouse Geese.

These magnificent birds, next in merit to the Embden, and by many fanciers preferred to them, have compact bodies, rather short legs, and will often outweigh the Embdens. Their bodies and breasts are light gray; the neck dark gray, the color deepening as the head is approached; the wings are colored like the neck, but getting lighter towards the belly,



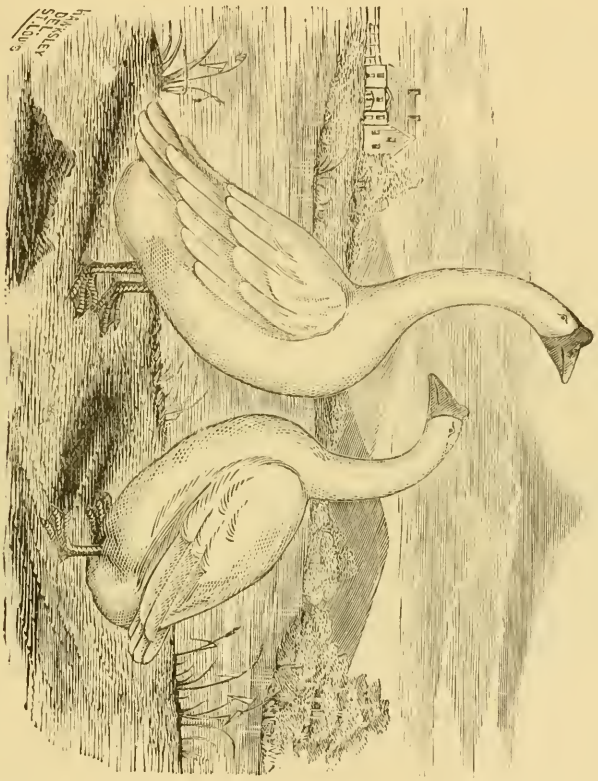
TOULOUSE GEESE.

which, together with the rump, is white. The legs and feet are a deep reddish orange, and the bill the same color, but inclining to brown. In quality of flesh there is little if any difference between the Embden and the Toulouse.

IV. White Chinese Geese.

The White Chinese geese, from their immense size, pure white color, and swan-like appearance are much admired by fanciers who have ponds of water. Whether swimming or on land, they are pleasing and graceful

in movement. The color is pure white; the bill and the knob on the head orange colored, and the color of the legs the same. A peculiarity of this breed is the great disparity in size between the males and females,

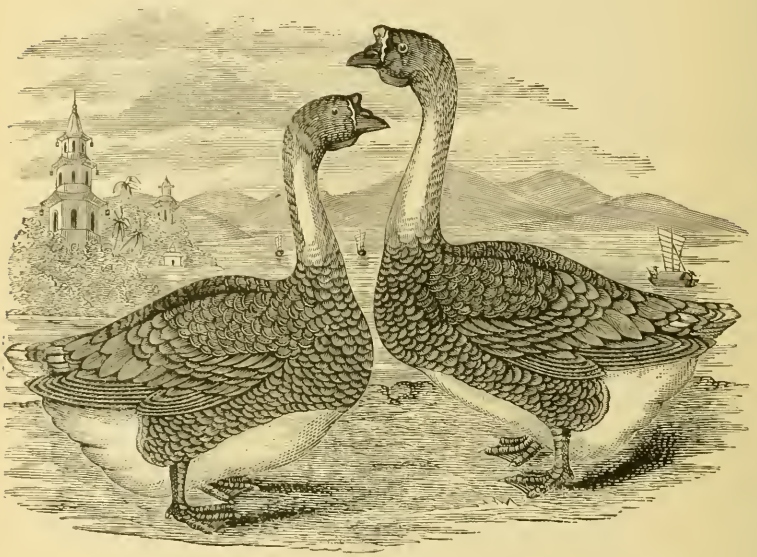


WHITE CHINA GEESE.

the former being one-third larger than the latter. They are prolific of eggs, which are rather small-sized for the size of the birds, and the goslings are tender and delicate in flesh. They are hardy and prolific, sometimes rearing three breeds in a season.

V. Hong Kong Geese.

The Hong Kong, or gray China goose, is supposed to be the variety from which the White Chinese goose sprung. Certainly, there are not greater differences between the two than between the Embden and Toulouse. The Hong Kong is distinctly knobbed, and in size is between a goose and swan. Their distinguishing marks are the knob on the top of the head, the feathered dewlaps or wattle under the throat, and distinct dark stripe down the neck. They vary in color, but the true color

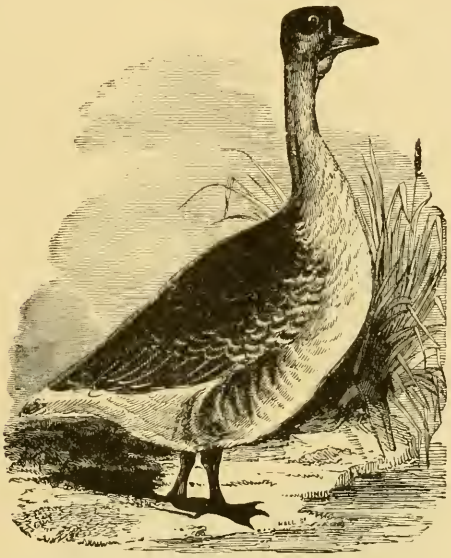


HONG KONG GEESE.

is a grayish brown on the back and upper parts of the body, changing to white or whitish gray under the abdomen; the neck and breast yellowish gray, with a distinguishing stripe of dark brown running down the back of the neck from the head to the body; the bill and legs are orange, and the protuberances at the base of the lower bill very dark, approaching to black. They are nocturnal in habit, very prolific in eggs, and the flesh of the young birds is superior in quality.

VI. The African Goose.

This is one of the largest of any of the varieties of geese, and is remarkable for its upright carriage, carrying the neck straight and the head level in walking. It is rather a rare bird in the United States, and has sometimes been called the Siberian Goose, but the name African goose is undoubtedly the true one. The bill is hooked or armed with small inden-



AFRICAN GEESE.

tations along the sides; at the base of the bill on top is a bright vermilion colored fleshy tubercle, and a hard, firm, fleshy membrane under the throat. The head and upper part of the neck are brown, deeper on the upper side and lighter on the underside. The cut will give a good idea of the principal characteristics of this variety.

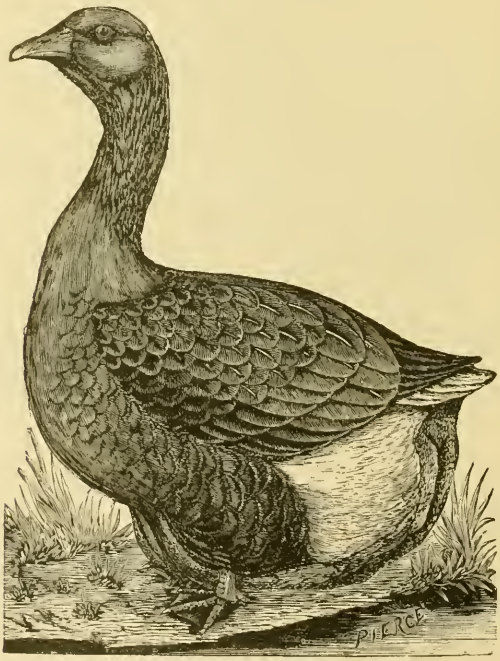
VII. The Canada or Wild Goose.

This goose is well known all over the United States and Canada, breeding in the far North, spending the spring and autumn in the more temperate regions, and going South, even to the Gulf of Mexico, in the winter. It is the most sagacious of any of the goose tribe, and when

hatched from wild eggs, often becomes thoroughly domesticated in the first generation, and breeds freely with the other varieties of geese. When bred on the farm, the flesh retains much of the game flavor of the wild birds. It is certainly one of the handsomest of water fowls.

VIII. Egyptian Geese.

This is a rare variety in the United States, but is prized for its beautiful plumage and stately carriage. It is a small bird, weighing about eight pounds, but elegant and striking in its plumage. The color is dark red around the eyes; the bill white; a red ring about the neck; the neck and breast light fawn gray, with a maroon star on the breast; the belly red and gray; the wing feathers one-half deep rich black, and the rest pure white, with a black bar running across the centre; the back light red, changing to dark red near the tail; the tail jet black.



STANDARD TOULOUSE GOOSE.

WATER FOWL.

CHAPTER VIII.

VARIETIES OF DOMESTIC DUCKS.

I. DUCKS ON THE FARM.——II. VARIETIES BEST ADAPTED TO THE FARM.——III. AYLESBURY DUCKS.——IV. ROUEN DUCKS.——V. THE COMMON WHITE DUCK.——VI. CAYUGA BLACK DUCKS.——VII. MUSCOVY DUCKS.——VIII. BLACK EAST INDIA DUCKS.——IX. CALL DUCKS.——X. OTHER AND RARE DUCKS.

I. Ducks on the Farm.

Year by year both ducks and geese are becoming more popular as an addition to the regular farm stock. Ducks, especially, are yearly receiving more and more attention. First, from the fact that the ducklings are the most active and indefatigable insect hunters known; second, they are more easily reared than any other farm birds; third, their feathers are valuable, and fourth, the eggs and young ducks find ready sale in the markets. In the fields of the market gardener they are especially valuable, and all those who know their value in this respect would raise them, if only for their aid in summer as insect destroyers.

II. Varieties Best Adapted to the Farm.

When the flesh and feathers are the principal objects, the white breeds are best; but when flesh is the prime object, and handsome, ornamental qualities are desired, the Black Cayuga and the Rouen duck will give satisfaction. We think the young of the Rouen duck the best insect destroyers of any of the large breeds, and the young of the common gray duck, the best of the smaller breeds. The Muscovy, one of the largest of ducks, has really little to recommend it, except size, and even here, the Cayuga, the Rouen and the Aylesbury will nearly compete with them, and are far superior in quality of flesh. One reason, probably, why ducks have received so little attention in the West, is that wild ducks have been so numerous in the spring and fall that a mess might at any time be had for the shooting. They are, however, becoming scarcer

and higher year by year, and hence, except in new settlements near water, more and more attention is yearly being paid to the raising of tame ducks.

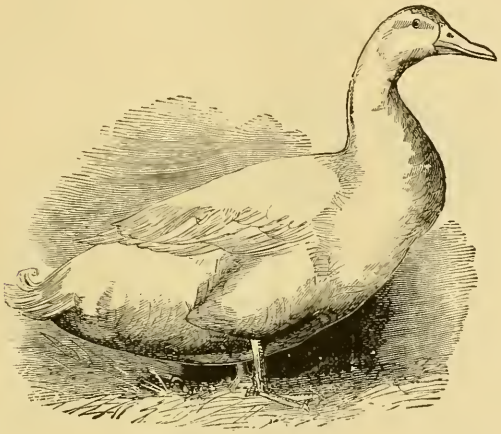
AYLESBURY AND ROUEN DUCKS COMPARED.

The raising of ducks is exceedingly simple. They are little liable to disease and are able to take care of themselves soon after being hatched. The mean period of incubation is thirty days. The eggs should be placed under a large hen, light Brahma preferably, and when hatched

they should have a pool of clear water to play in, however small it may be. Their food may be the same as that of young chicks, and if placed where insects abound, they will soon rid the squash, melon, cucumber, or other patches of these enemies of the gardener.

III. Aylesbury Ducks.

Of all the English breeds, the Aylesbury is undoubtedly the best, and, taking into consideration the color of the feathers, it is one of the most useful of the species introduced into the United States. They are scarcely so heavy as the Rouen, but eighteen pounds per pair is not unusual. They are prolific in eggs of pure white color, and quite thin in



AYLESBURY DRAKE.

the shell. The Aylesbury is rather inclined to fall down behind from the stretching of the abdominal muscles. In breeding, always avoid such birds, and as soon as it is noticed, kill and dress them for market, since as soon as this becomes the case they are generally sterile. This will apply to all ducks, and hence, in the selection of the male, take those that are especially free from this disability.

IV. Rouen Ducks.

This name is probably a corruption of Roan duck; at all events there is no evidence that the breed originated at the French town of this name.

It is undoubtedly a variety of the Mallard or Gray duck, and bred together the young come uniform in their markings. The color should closely

ROUEN DUCKS.

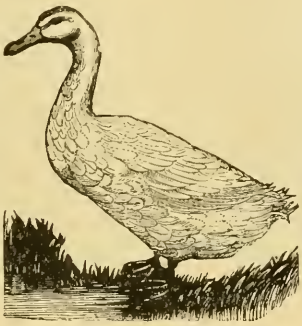
approximate that of the wild Mallard duck. In fact, the markings of the wild duck will perfectly describe the tame, enlarged and improved variety. The eyes, however, are more deeply sunken, and they have the

disability of soon falling behind, the abdominal protuberance being developed at an early age.

They are the largest as they are the most quiet of ducks, and seldom wander. When fat, they have been made to weigh nearly twenty pounds the pair, and drakes of nine or ten weeks old have been known to weigh more than twelve pounds the pair. The flesh is most excellent and they are prolific layers of large, rather thick-shelled, bluish-green eggs.

V. The Common White Duck.

This duck is too well known to need description. They are not unlike the Aylesbury, except in size. Since the introduction of the larger breeds, they have fallen into disrepute and are now seldom found pure.

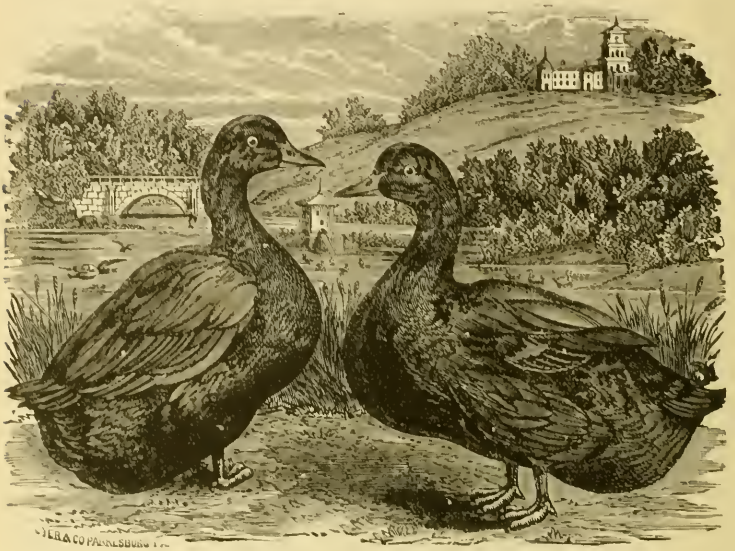


COMMON WHITE DUCK.

VI. Cayuga Black Duck.

Of the origin of this famous American duck, nothing positive is known. They have been bred about Cayuga lake, New York, for many years. They are essentially a water duck, rarely rising from the water, and so clumsy on land that they seldom wander far. In color they are black, or rather deep brown black, with a white collar about the neck, and white flicks on the breast; the drakes usually show more white than the ducks, and the green tint on the head and neck being far more pronounced: in fact the duck should have but a faint strip of green on the head, neck and wings. In breeding, the darkest males should be selected, since they incline to breed to white. They are good layers, producing about eighty

to ninety eggs in a season when well fed. The flesh is excellent, dark and high flavored, and the birds hardy. The weight of the birds at six to eight months old, if well fattened, is from twelve to fourteen pounds



CAYUGA BLACK DUCKS.

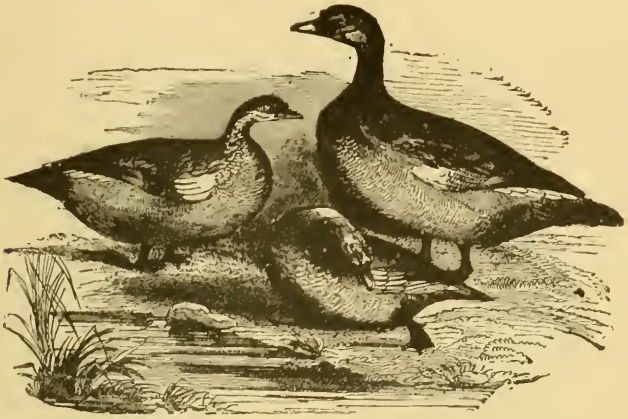
per pair, and sixteen pounds has been reached. For rearing entirely on land, we have not found them so good as the Rouen or Roan, but near lakes, ponds and streams there are no better or more profitable ducks.

VII. Muscovy Duck.

The Musk, or Brazilian duck was once regarded with great favor, and certainly they are both handsome and large, the drakes often weighing ten pounds. The color is a very dark, rich, blue-black, prismatic with every color of which blue is a component; there is a white bar on each wing, and more or less white about the head and neck. The feathers in the back of the drake are fine and plume-like; the legs and feet are dark. In warm climates they are said to be prolific, but our experience with them, years ago, was that they are neither hardy nor good layers. They are readily distinguished by the red membrane surrounding the eyes and covering the cheeks.

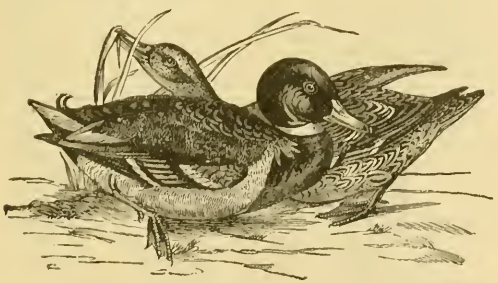
VIII. Black East Indian Ducks.

These are really black, and are among the most beautiful of ducks. From time to time they have appeared under various names, as East Indian, Labrador, Buenos Ayres, and Brazillian ducks. They are quite



BLACK EAST INDIA DUCKS

hardy, and their color would suggest that they are closely related to the Mallards. Their beauty and hardiness, together with their small size will recommend them to amateurs; but for profit they cannot compare with the best of the large breeds.

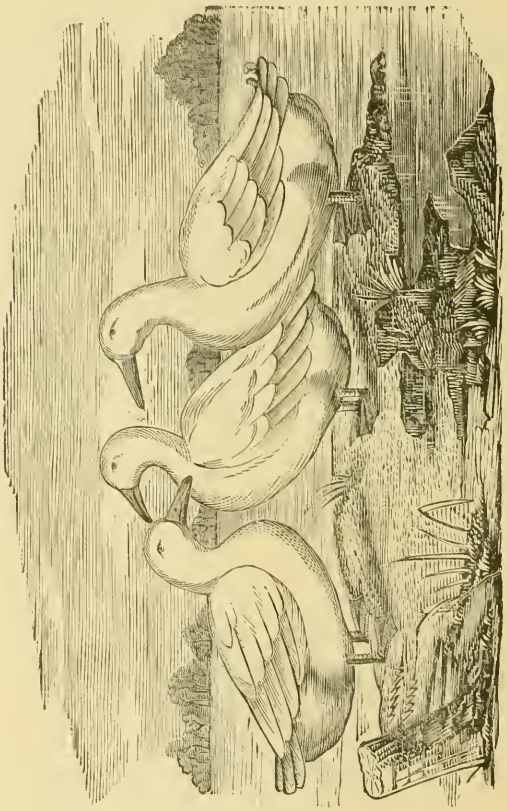


GRAY CALL DUCKS.

IX. Call Ducks.

There are two varieties of ducks which bear the same relation in size to the large breeds that Bantams do to other barn-yard fowls. These

are the Gray and the White Call duck. The Gray is the miniature counterpart of the Roan or Rouen duck, and the White resembles the Aylesbury except in size and color of the bill, which in the White Call duck is a clear yellow, while in the Aylesbury it is a flesh color. They



WHITE CALL DUCKS.

are pretty things on a lake or piece of water in ornamental grounds, and the colored variety is used by sportsmen as decoys for other ducks, they being noted for their loud, shrill, and oft repeated call; hence the name.

X. Other and Rare Ducks.

Among the ducks of elegant plumage lately domesticated is the Wood duck, known all over the West, and now disseminated as the Carolina duck. It is one of the most beautiful of any of the varieties in the brilliancy of its plumage and varied elegance of the markings, one of the most striking in the graceful plume of feathers falling back from the head. They are so easily domesticated that they will allow themselves to be handled, if always treated with gentleness.

The Mandarin duck, a Chinese variety, is also a bird of splendid plumage, but rare.

Of the crested ducks, the White and the Black Poland are best known. Both are crested, the crest varying in size, but always bearing a ball of feathers, quite round.

Another very rare duck, the Crested duck, said to be native to America, is described by Mr. Latham as being "the size of the wild duck," (an indefinite description), "but much larger, for it measures twenty-five inches in length; a tuft adorns its head; a straw yellow, mixed with rusty-colored spots is spread over the throat and front of the neck; the wings, speculum blue beneath, edged with white; the bill, wings and tail are black; irides red, and all the rest of the body ashy-gray."

ARCTIC WATER FOWL.

PART X.

Diseases of Poultry.

HOW TO KNOW THEM; THEIR CAUSES, PREVENTION AND CURE.

Diseases of Poultry.

CHAPTER I.

THE CARE AND TREATMENT OF SICK FOWLS.

I DIVISION OF DISEASES INTO GROUPS.——II. APOPLEXY.——III. VERTIGO.——IV. PARALYSIS.——V. CROP-BOUND.——VI. DIARRHŒA.——VII. CATARRH.——VIII. BRONCHITIS.——IX. ROUP.——X. GAPES.——XI. PIP.——XII. CONSUMPTION. XIII. INFLAMMATION OF THE EGG PASSAGE.——XIV. LEG WEAKNESS.——XV. RHEUMATISM.——XVI. POULTRY LOUSINESS.

I. Division of Diseases into Groups.

The diseases to which poultry are subject, are comparatively few. Poultry lousiness; roup, a contagious disease; gapes; crop-bound; diarrhœa; catarrh; inflammation of the egg passage, and rheumatism, are the principal ones. These and a few others, only, will be noticed. They may be divided as follows: Diseases of the brain and nervous system; diseases of the digestive organs; diseases of the lungs and air passages; diseases of the egg organs; and diseases of the skin.

II. Apoplexy.

Causes.—The cause of this disease is usually overfeeding and confined quarters. The bird may be moping for some days, but usually the trouble is not noticed until the fowl falls, and dies with hardly a struggle.

What to do.—The remedy is to open the largest of the veins under the wing. By pressing on the vein between the opening and the body, the blood will continue to flow until the pressure is released.

Prevention.—The prevention is plenty of exercise, and abstinence from over-stimulating food.

III. Vertigo.

This is caused usually by strong feeding and lack of exercise. The fowl runs in a circle with but partial control of the limbs, and sometimes falls and dies.

What to do.—When observed, hold the head of the bird under a stream of cold water which will soon give relief. Ten grains of jalap may be administered afterwards, and the bird be kept on a rather low diet.

IV. Paralysis.

This is also induced by the same causes as the two last mentioned diseases, and is the direct effect of some disorder of the spinal cord. But little can be done, when once a bird is thus attacked.

Prevention.—Plenty of exercise, a mixed diet, and well ventilated but dry quarters.

V. Crop-Bound.

Causes.—This is caused by irregular feeding. A hungry bird stuffs his crop to such a degree, that the whole, when moistened, becomes a dense impacted mass. Sometimes any large hard substance will serve as a nucleus for the gradual gathering of other substances around it.

What to do.—The treatment is to puncture the upper part of the crop, loosen the mass by degrees with a blunt instrument, and gradually remove the lump. If the incision is large, the slit may be sewed up, and the bird kept for ten days on soft food. If in good condition, the cheapest way is to kill the bird unless it be a valuable one.

VI. Diarrhœa.

The symptoms are obvious.

What to do.—The remedy is to give something to check the purging. Try the following:

No. 1.
5 Grains powdered chalk,
5 Grains Turkey rhubarb,
2 Grains Cayenne pepper.

If this does not check the discharge, give the following, until the bird is relieved:

No. 2.
1 Grain opium,
1 Grain powdered ipecac.

Give every 5 hours, until relief is had.

VII. Catarrh.

Causes.—Damp quarters, and roosting in exposed situations.

What to do.—In simple cold or catarrh there will be swelling of the eyelids, a watery or other discharge from the nostrils, and the face may be more or less swollen at the sides.

What to do.—Remove to comfortable quarters, and give warm food, liberally dusted with pepper. This will usually effect a cure.

VIII. Bronchitis.

Causes.—Bronchitis results when the effects of a cold expend themselves in the lungs and air passages.

How to know it.—There will be cough, a raising of the head to breathe, and a more or less offensive smell.

What to do.—In severe cases, give the following:

No. 3. 1 Grain calomel,
$\frac{1}{8}$ Grain tartar emetic.

Strip a feather, also, to within one-half inch of the end, and swab the throat thoroughly with powdered borax; also, let the fowls drink of the following:

No. 4. $\frac{1}{4}$ Ounce chloride of potassium,
2 Quarts soft water.

This disease is sometimes called croup.

Preventives.—Good ventilation, cleanliness, and proper care.

IX. Roup.

When this disease is once found, the affected fowls should be either killed and burned, or else removed out of the way of the well ones. Or, better, remove the well ones to other quarters. Separation must be complete; otherwise the entire flock will be subjected to the disease. It is one of the most fatal pertaining to fowls, and action should be decisive and promptly taken.

How to know it.—The symptoms, at first, are like those of severe catarrh; but the discharge from the nostrils is thick, opaque, and of a peculiar and offensive odor. Froth appears at the inner corners of the eyes: the lids swell, and often the eyes are entirely closed; the sides of the face become much swollen, and the bird rapidly loses strength and dies.

What to do.—The fowls must have dry, warm quarters, and soft and stimulating food. Give, as soon as possible, for a small fowl, a teaspoonful, or for a large fowl, a tablespoonful of castor oil. The nostrils should be syringed, by inserting a small syringe in the slit of the roof of the mouth, with one part of chloride of soda to two parts of water. Three or four hours after the oil has been given, having divided the following into thirty doses, give one, two or three times a day:

No. 5. $\frac{1}{2}$ Ounce balsam copaiba,
$\frac{1}{4}$ Ounce liquorice powder.
$\frac{1}{2}$ Drachm piperine.

This is enough for thirty doses; enclose each dose in a little gelatine, and administer as directed. If the fowls continue to get worse, kill at once and bury them.

X. Gapes.

This is caused by parasitic worms (*Sclerostoma syngamus*) in the wind-pipe, and occurs usually in chickens from two to four months of age. It has been said to be produced from a small, tick-like parasite, lodged on the heads of the chickens. If a case occurs, examine the chickens with a pocket lens, and if the parasites are found, destroy them with the following, which is good, also, for hen lice:

GAPE WORM.

2, natural size; 1, enlarged.

No. 6.

1 Ounce mercurial ointment,
1 Ounce lard oil,
½ Ounce flowers of sulphur.
½ Ounce crude petroleum.

Mix, by melting in a warm bath, and apply when just warm.

To cure the gapes, strip a small quill feather to within half an inch of the end; dip it in spirits of turpentine, and insert it into the opening to the wind-pipe at the base of the tongue; turn it around once or twice, and withdraw it. If relief is not had, repeat the operation again the next day. Give warm shelter, good, soft food, well mixed with a little black pepper, and skim-milk to drink.

XI. Pip.

This is not a disease but the result of another disease. It is the formation of a scale or crust at the tip of the tongue.

What to do.—Remove the incrustation, wash with chloride of soda, and if the nostrils are stopped, inject as advised for roup: if the fowl is very much ailing, give a teaspoonful of castor oil.

XII. Consumption.

This is a rare disease among fowls that are kept on the farm. It is a gradual wasting away, with cough and the throwing out of matter, and is the result of too close confinement in damp, unhealthy quarters. It often becomes hereditary in fowls so kept, and if you are unfortunate enough to have got such fowls from some breeder of pure-bred fowls, who was not attentive to his stock, kill them, since it is worse than useless to breed from them.

XIII. Inflammation of the Egg Passage.

How to know it.—The indications of this disease, rare in fowls kept on the farm, are as follows: If the inflammation is at the lower end of the passage, the egg is without shell; if the inflammation is in the middle

portion, the membrane is misshapen, or incomplete; if the whole passage is inflamed, the yolk is passed out without any covering.

The laying of soft shelled eggs is not evidence of inflammation. It may be the effects of being driven about, or of a want of lime material in the system to form the shell. In inflammation there will be fever, and the feathers, especially over the back, will be ruffled. The hen will be moping, and at times will strain to discharge the contents of the passage.

What to do.—The proper remedy is to give the following;

No. 7. 1 Grain calomel,
1-12 Grain tartar emetic.
To be given in a little gelatine.

Keep the hen afterwards, for some time, on nourishing but not stimulating food. As a rule the cheapest way, unless in the case of a valuable fowl, is, if the difficulty returns, to kill the fowl.

XIV. Leg Weakness.

This is a disease of young fowls and more generally of young males, rather than of pullets. The bird seems unable to support its weight, and constantly sinks down. The large Asiatic fowls are most subject to it. The remedy is nourishing diet, with a due proportion of insect or animal food. The grain should be cracked wheat, coarse oat-meal or barley meal, and if from three to eight grains of citrate of iron be daily given, it will greatly assist as a tonic.

XV. Rheumatism.

Causes.—This is a disease arising from cold, damp quarters, or those badly ventilated. Another cause is the chickens running in the dew or wet in the early season. Cramp is produced by the same causes. Little can be done, once they are affected.

Prevention.—The prevention is obvious. Good, clean, well ventilated quarters, and plenty of nutritious and varied food.

XVI. Poultry Lousiness.

There would seem to be little need for the appearance of this nuisance, if care were taken, and if new fowls introduced were first examined with a lens; for the parasites are very minute. The common hen louse, is larger than the "hen spider" so called, which is almost microscpic.

What to do.—The first may be destroyed by sprinkling the breeders and nests with Scotch snuff or flowers of sulphur, at intervals of two or three days.

The hen spider is more difficult to exterminate. When hens have been allowed to roost in a horse stable, we have known the horses and every

crevice to be so infested that only the most rigid means could exterminate them. This was by the application of flowers of sulphur, moistened with kerosene, applied to the roots of the manes and tails of the horses, and a thorough application to the fowls themselves. In addition, every part of the building must be thoroughly cleansed and washed, and every surface, crack and crevice filled with lime, slacked with ammoniacal liquor from the gas works; or in place of this use a little carbolic acid with ordinary lime wash. Wash, also, all the furniture, perches, nests, etc., with a solution of one pound of potash, to a quart of water, or the ammoniacal water of a gas factory. Then put in plenty of dust baths, and the difficulty will probably be ended.

PART XI.

DOGS.

HISTORY, MANAGEMENT AND CHARACTERISTICS OF THE VARIOUS BREEDS.

DOGS.

CHAPTER I.

DOGS AND THEIR CHARACTERISTICS.

I. SOMETHING OF DOG HISTORY.——II. ZOOLOGICAL CLASSIFICATION OF DOGS.——III. SO-CALLED WILD DOGS.——IV. THE DOG AS A COMPANION OF MAN.——V. CHARACTERISTICS OF THE GENUS CANIS.——VI. GESTATION OF THE DOG.——VII. PECULIARITIES OF DOGS.——VIII. THE PRINCIPAL VARIETIES OF DOGS.——IX. THEIR DIVERSIFIED CHARACTER.

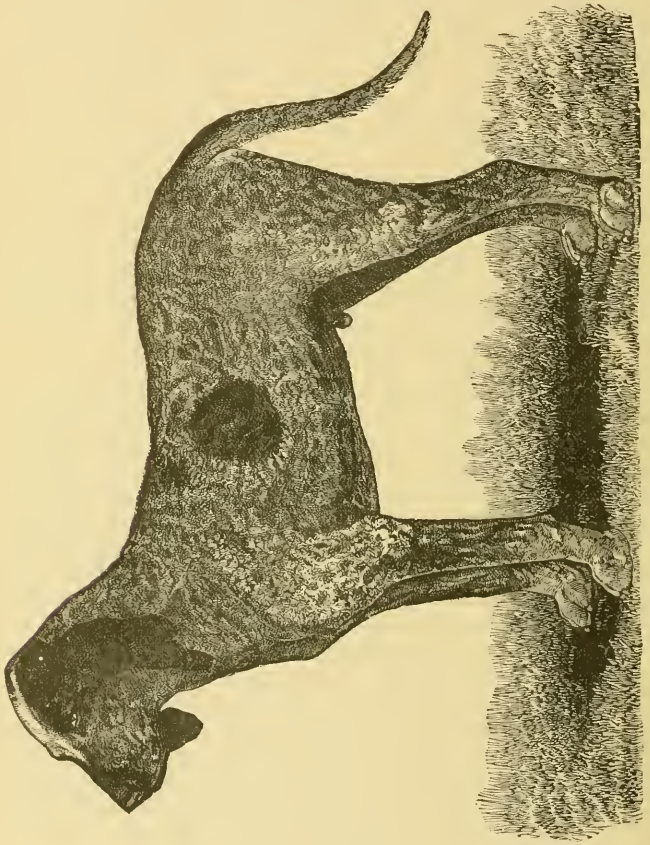
I. Something of Dog History.

It has been thought by many that the dog was the first animal domesticated by man. To substantiate this there is nothing but theory, and the added fact that even the most savage and degraded tribes of the human race all keep dogs; but mere savages use them not so much in the chase, as to give warning to the camp of the approach of danger. And, notwithstanding the brutality of their treatment, the dogs of savages evince the same reliant attachment to their masters, and the same submission to their will, as those of more intelligent and civilized people; but they lack that self-reliant character, intelligence of action, faithful self-denial, and aptitude to anticipate every want of their masters, that the improved and better educated dogs of enlightened people possess. In fact, the dogs of the savage and those of selfish or brutal masters, compared with better treated ones, all prove conclusively that the dog is simply what he is made, and a pretty good index to the character of the master. The dog will partake of his master's savagery, meanness, selfishness, foppishness and dishonesty, as he will of any of the nobler qualities that actuate human kind. These qualities, as in men, may be inherited, and strengthened through successive generations, or they may be bred out through successive generations of intelligent care.

II. Zoological Classification of Dogs.

The dog belongs to that division of animals known to naturalists as *vertebrates*, that is, having a back bone extending backwards from the

skull; the class, *mammalia*, suckling its young; *unguilata*, having its extremities armed with claws or nails; the order *digitigrades*, because they walk on their toes. The genus is named *canis*, and includes the wolf,



THE GASCONY HOUND.

jackall and fox: but although there is a general resemblance of form between all these animals, there is little else in common between the dog and the other animals of the genus. As with the horse, the ox and the sheep, the truly wild species is extinct, if indeed either of these animals

has existed in a wild state since the historical period began. In fact, all the so-called wild dogs, of which stories are told, are dogs escaped from domestication, and which have bred and multiplied in a semi-wild state. The so-called wild dogs really partake more of the character of the wolf than that of the true dog; for it is a fact that the wolf may be domesticated, and it is also true that the wolf and dog will breed together, and their progeny is said to be fertile.

III. So-Called Wild Dogs.

In some parts of Germany, Italy, Spain and Turkey, there are dogs essentially wild, so far as their ownership and care by man are concerned. In India, there are troops of them, to which the Dhole, the Pariah, the wild dog of the Deccan, and the half-wild Thibiet dog belong. The Dingo or wild dog of Australia, is decidedly wolf-like; and the Esquimaux, and other dogs used for drawing sledges on the snow, are of the same character; the dogs of the North American Indians also partake of this wolf-like nature. The Hare-Indian dogs are peculiar to tribes of Indians, (Hare-Indians) who roam along the Mackenzie river and Great Bear lake. They have neither courage nor strength sufficient to destroy the larger animals, but they are peculiar in their broad feet, and light bodies, which enable them to run over a slight crust on the snow, and thus overtake and keep at bay the reindeer and moose until the hunters come up.

IV. The Dog as a Companion of Man.

The horse, the elephant and the dog are the only three animals subject to man, that in the least seem to indicate a decided affection for and reliance upon their master. The two first, unless in very exceptional instances, simply submit to man and perform the tasks required of them. Only under the most humane and intelligent treatment, do they requite the favors received and evince constant affection; otherwise, they eat, drink, and rest as may be provided; submit to commands, recognize the voice of the master, but show no regard, except such as results from the gratification of their appetites. Not so the dog; our home is his home, our property his care, our will his pleasure, our sports his pastime. His affection and veneration for his master are shown in every possible way. Whether hungry or well-fed, or whether ill or carefully provided for, he is the same sagacious, painstaking, docile servant-friend, talking volubly in his dog language, evincing by his intelligent eye and eloquent tail his eagerness to serve. His master's friends are his friends too, and the home of the friend his home so long as the master wills. In the words of the poet Burns: "See how the dog worships his master;

with what reverence he crouches at his feet, with what reverence he looks up to him, with what delight he fawns upon him, and with what cheerful alacrity he obeys him." Or, as Byron expressed it:

> "But the poor dog, in life the firmest friend,
> The first to welcome, foremost to defend,
> Whose honest heart is still his master's own,
> Who labors, fights, lives, breathes for him alone."

The dog was the same in ancient times. The ancient poets give testimony of his incorruptible fidelity and lasting affection for his master. Thus Homer in the "Odyssey" has immortalized the aged dog Argus; when all others had forgotten the returning hero, Ulysses, the King in the disguise of a beggar at length coming to his palace, was recognized by none, even an old servant of the house, but—

> "Argus the dog, his ancient master knew;
> And, not unconscious of his voice and tread,
> Lifts to the sound his ears, and rears his head.
> He knew his lord—he knew and strove to meet;
> In vain he strove to crawl and lick his feet;
> Yet all he could, his tail, his ears, his eyes,
> Salute his master and confess his joys."

Cuvier, the great naturalist, avers that the dog exhibits the most complete conquest man has ever made. Whether the master be rich or poor, each individual dog adopts his manners, distinguishes his voice, defends his goods, and remains attached to him even unto death; all this springs not from necessity or constraint, but arises simply from gratitude and true friendship.

The dog is the only animal that has followed man all over the earth; he is the only animal capable of becoming man's ally against other animals, and is hence an imperative necessity in the establishment of society. He is a most valuable ally by reason of his swiftness, acute sense of smell, his great strength, wonderful courage and unswerving fidelity to his master, which neither the threats nor blandishments of others can overcome. Hence, the dog may be considered one of the first and most important factors in civilization; he guards the flocks of the barbarian, the home of the more civilized, and among enlightened people, becomes a sagacious and unswerving friend; performing duties for the shepherd, the drover, the sportsman, and about the home, that could not be compassed by any other means.

V. Characteristics of the Genus Canis.

The general characteristics of the dog and wolf are not dissimilar; they have the same elongated nose; their dentitions, (teeth) are similar; both delight to hunt in packs; their food and their digestive organs are

alike; their period of gestation is the same, and they are said to be fertile together. The Jackall, the Wolf, the Fox and the Dog, are principal members of the *Genus Canis*. It will not be necessary here to follow the matter further, than simply to state the opinions of some naturalists on the subject:

Buffon thinks the Shepherd dog the original type, and has ingeniously sought to trace all the varieties from that source. Others, again, believe the wolf the original of the dog. Youatt, a critical authority, believes the wolf and dog to be distinct, notwithstanding the many points of resemblance. Our opinion is that the dog is quite distinct from the wolf; more so than the Chinese and Caucasian races of men. This, however, is a matter of little consequence. We have the dog in its varied useful forms, and so long domesticated, that his noble qualities have been handed down to us since before written history. We have also grown out of the dislike to dogs, which prevailed among the Jews and other oriental nations, who tolerating dogs simply as scavengers, applied to them the meanest terms of reproach. To call a man a dog is still regarded among Oriental nations as the most opprobrious epithet that can be bestowed; and among our more ignorant and vulgar population, there are some who hold to the same sentiments. The more enlightened rightly regard the dog as at the head of the animal kingdom in respect to intelligence, honesty and faithful devotion.

VI. Gestation of the Dog.

The proper age at which the dog should begin to bear young, is two years; the reproductive power lasts to eight or nine years. The number of young produced at a birth will average six; the most favorable season for copulation is early in the spring or late in winter, and the average period of gestation is sixty days, the shortest being fifty-five days, and the longest period sixty-three days.

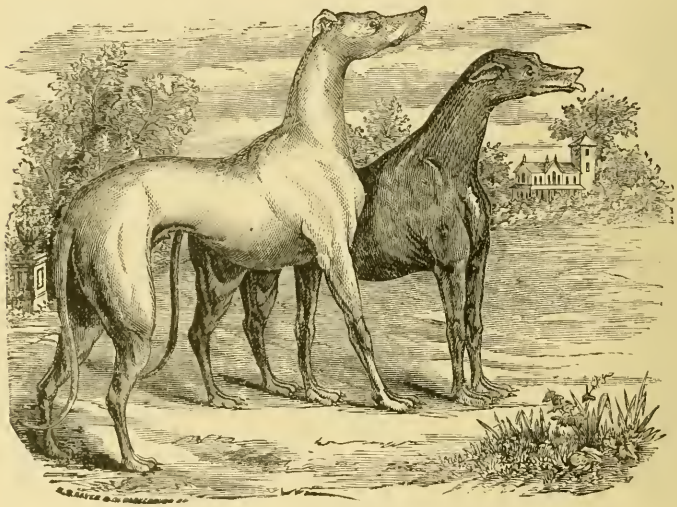
VII. Peculiarities of Dogs.

As distinguished from other members of the *Genus Canis*, the dog (*sub-genis canis familiaris*,) has the pupil of the eyes round, while those of the wolf are oblique, and those of the fox upright and long; the dog carries its tail curved upwards, and if it has a hairy tip, it is generally white; another peculiarity is that the *genus canis* always has two tubercular or hollow teeth behind the large carnivorous or eye teeth, in the upper jaw.

A late English writer, George Frederic Pardon, has the following in relation to wild dogs, which will raise a smile at the ignorance of the writer, both in confounding the prairie-wolf with the dog, and in speaking

of the troops of wild dogs, obeying the voice of no owner, in the South-west. It is, however, not further out of the way than the assertion of another writer, who stated that all the wild animals of America, had "short tails;" this latter assertion was in the last century, but Mr. Pardon's testimony is of recent date. He says:

"In the extreme western districts of North America, and even in the neighborhood of towns in the South-west, troops of dogs, obeying the voice of no owner, and living upon such game as they can catch, or preying upon the carcasses of any animals that have happened to die on the



PAIR OF GREYHOUNDS.

road, or in the woods, wander about lawlessly, and disturb the quiet night with their howls. In the far West these wild dogs are known as prairie-wolves, but if caught when quite young, they are easily tamed."

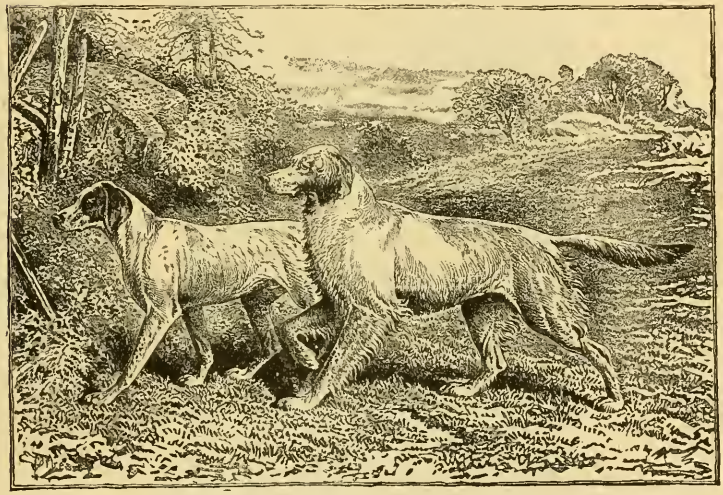
The fact is, that the prairie-wolf is no more easily tamed than the large gray wolf, or the fox, and not nearly so easily domesticated as the black bear, or its diminutive relative, the racoon. Neither are they dog-like in any sense, but are essentially wolves, and unlike the fox, do not seek the habitations of man, nor increase with the settlement of a country, as do foxes.

VIII. The Principal Varieties of Dogs.

The dog tribe in all its varieties may be distinguished by the following peculiarities:

1. Dogs having the head, and especially the muzzle, lengthened as the Greyhound, in its varieties. To these belong the Greyhound, the Italian Greyhound, and the noble Scotch and Irish Deer-hounds, and the Albanian hound.

2. Those having the head and muzzle less elongated, as the Hound, Shepherd-dog, Spaniel, Setter and Pointer. This class comprises the



POINTER AND SETTER.

most useful, intelligent and noble of the whole tribe, including all among the Spaniels, the noble Newfoundland, and the sagacious St. Bernard dogs.

3. All that class notable as having the muzzle essentially shortened, and the cranium on top of the head elevated, as Terriers and Bull dogs. Among the valuable farm dogs of this class are the Mastiff, now quite rare, and the Terriers: the dangerous ones are Bull dogs, and the useless are Pug dogs, though the latter are not deficient in affection and intelligence.

Again, dogs may be divided into classes in which all of the class possess peculiarities in common, intensified in special directions. Thus the Shepherd dog, belonging to the Spaniel class, is a dog of remarkable sagacity, and affectionate attachment to its master. So wonderfully have its special qualities been intensified by careful breeding and selection, that the Scotch Collcy has come to be regarded as a distinct breed of the family of Spaniels to which all true Shepherd dogs belong. Next may be taken the Mastiff and all that class of large, short-haired dogs noted especially for their strength and determination. Among the dogs of

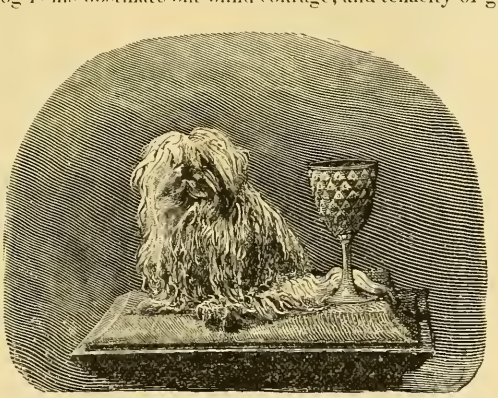
HEAD OF BLOODHOUND.

fleetness and staying qualities are the Greyhounds in their several varieties, the Deerhound, Foxhound, and Bloodhound. Then come the Newfoundland, the Water Spaniel, the Pointer, Setter, and Poodles. Among dogs especially used to hunt vermin (rats, mice, badgers, etc.) are the Terriers, including the Black-and-Tan, Scotch, and Skye Terriers. Among pet dogs, of the larger class, the Dalmatian, or Spotted Coach dog is best known, and of the more diminutive or trumpet-dogs are the Blenheim Spaniel, the King Charles Spaniel, the small terriers, the Italian Greyhound, the Poodles and Pugs—the latter as unmitigated nuisances

both in temper and physical infirmities as could well be imagined. Of the large class, the Mastiff is a noble dog, and faithfully submissive to

THE DALMATIAN OR COACH DOG.

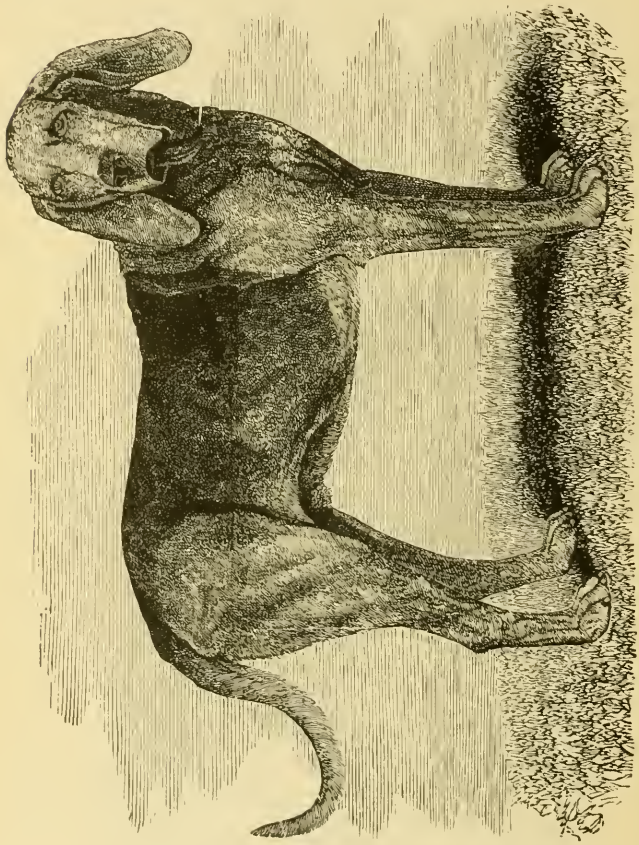
his master, but dangerous to strangers, while the only valuable quality of the Bull-dog is his obstinate but blind courage, and tenacity of grip. The



SMALL SKYE TERRIER.

Bull-dog is valuable, however, when modified by crossing with more intelligent dogs of the larger breeds, and especially valuable in the sub-breed known as the Bull-terrier.

The most common, and most diversified of the dog tribe, are those known as Curs; they are of no particular breed, but are seemingly made up



ST. HUBERT HOUND.

of chance crosses of short-haired breeds. They are by no means to be despised, since they are deficient, as a rule, neither in affection, sagacity, courage, nor devotion to their masters.

IX. Their Diversified Character.

No animal ever brought under subjection to man has assumed such diversified characters as has the dog; it is one of the most wonderful exhibitions of variation of species in the natural history of animated nature. Yet, in all this wonderful variation, there is no departure from the permanent characteristics of the species. They differ as to form, size, color, length of hair, temper, courage, and constancy of affection; and yet, from a scientific point of view, they are all the same, and have remained so in their attributes since the earliest ages. As illustrating this we give two forms—one a diminutive and highly-bred Terrier, of the Skye type, the size of which may be estimated by that of the goblet beside it, the other, the St. Hubert hound, combining in a considerable degree the courage and tenacity of the Bloodhound, with the strength and fleetness of the Deer-hound. The one is a mere toy, the other one of the noblest of dogs of the chase. Upon ordinary observation they might be relegated to different species, and yet, from a critical view, not only of the same genus, but of the same species—nay, even of the same family, that of *canis familiaris*.

CHAPTER II.

DOGS OF THE CHASE.

I. HOUNDS.——II. THE ENGLISH GREYHOUND.——III. THE ROUGH SCOTCH GREYHOUND OR DEER-HOUND.——IV. THE GRECIAN GREYHOUND.——V. THE PERSIAN GREYHOUND.——VI. THE RUSSIAN GREYHOUND.——VII. THE TURKISH GREYHOUND.——VIII. THE IRISH WOLF-HOUND.——IX. THE STAG-HOUND.——X. THE FOX-HOUND.——XI. THE BLOOD-HOUND.——XII. THE DACHSHUND.——XIII. OTHER HOUNDS.——XIV. THE FOX-TERRIER.

I. Hounds.

Under the name hound, in its original meaning, were included all dogs of the chase, or those used by man in securing game. Later, the term was restricted to dogs of the chase and field, including, of course, the Setter and Pointer; and it is now narrowed down to include only dogs that follow game by scent or sight, such as the Greyhound and its varieties; the Blood-hound, the Stag-hound, Fox-hound, the German badger-hound (Dachshund), Terrier and Beagle.

II. The English Greyhound.

For beauty and grace of form, and great speed combined with a fair amount of courage, the Greyhound has been famous from the earliest historical times, and has always been a favorite with the wealthy. Up to the time when the world became disenthralled from the despotism of feudalism, the Greyhound was the companion of Kings and so-called nobles. The larger and more powerful are still valuable, where large game may be coursed. Improved fire-arms, however, have gradually rendered this class of dogs less and less useful in the chase, and they are now kept principally for coursing the hare, as coursing dogs in exhibitions of speed, and for their noble appearance and beauty as pet companions to men of wealth.

Aside from its elegance, the Greyhound has little claim as a faithful companion to man, since it lacks real affection as well as sagacity. Its beauty and high breeding, however, are supposed to make up for its lack of sense and sensibility: and there are many instances reported from the far past showing it to have been deficient neither in courage, sagacity nor fidelity. One notable instance is of the hound Gelert, belonging to Llewellen, son-in-law to King John, in 1205. The master going to hunt could not find his favorite Greyhound, and was obliged to depart without him.

Returning from the chase his dog met him, covered with blood. Going to the chamber where his infant son lay in his cradle, the whole apartment showed signs of violence; the clothes were disturbed and bloody,

ENGLISH GREYHOUNDS.

and upon calling the child no response was heard. In a rage Llewellen plunged his sword into the breast of the hound, which, dying, looked reproachfully into his master's face. A closer search showed the infant

quietly sleeping beneath the bloody clothing, and a gaunt wolf lying dead close by, showing that the faithful hound had remained at home to protect and save the life of the young heir of the Welsh principality. The story is somewhat poetical, but it is good enough to be true.

The English Greyhound is the finest of the Greyhounds of to-day. Elegant in shape, possessing high breeding, good courage, fair sagacity and tractability, they are now kept principally in the United States for their beauty and swiftness on the course, and for hunting hares and rabbits. The illustration will give a good idea of the finer specimens.

That this dog, 400 years ago, possessed the highest characteristics of the best dogs of to-day is shown by the rhymes of Wynken de Werde, printer and poet, 1496, or at least attributed to him. They are as follows:

Headed lyke a snake,
Neckyed lyke a drake.
Footed lyke a catte,
Tayled lyke a ratte,
Syded lyke a teme
And chyned lyke a bream.

If by "teme" we understand deep sided, and by "bream," we understand that it had a strong, broad back and loin, we have the counterpart of the best dog of to-day, remembering always that the poet's license has exaggerated all the points; with this exception the rhymes will describe the smooth Greyhound, which was a dog of Kings and nobles, in Britain so long ago as the days of Canute. The most fashionable colors now are black, or maltese (bluish lead-color), though good dogs are shown of red, fawn, brindled and white as well as black or maltese; dogs with a tinge of gray about the jaws are especially good.

III. The Rough Scotch Greyhound or Deer-hound.

This is one of the noblest and most valuable of the Greyhounds, but now, like the famous Irish Greyhound, almost extinct—in fact, absolutely so in its purity. The modern Scotch Greyhound is a cross between the smooth Greyhound and the old Rough Scotch Deer-hound. It is a larger dog than the pure Greyhound, reaching a height of 28 inches, and a girth of 32, and weighing in working condition over 80 pounds. The color is red or fawn with black muzzle. They have speed sufficient to reach a deer, and a brace of the best of them the strength to pull one down. They have, also, courage, sagacity and docility.

IV. The Grecian Greyhound.

This is an elegant dog, smaller than the English Greyhound; the hair rather long, somewhat wavy; the tail having a thin brush of hair; the

legs also slightly feathered; the ear pendulous; the eyes large and intelligent. It is supposed to have been descended from the hound of the Greeks and Romans.

V. The Persian Greyhound.

This is a dog of great elegance and beauty; as delicate as the Italian, but large enough for coursing, and exceedingly swift; it is used in Persia for coursing the antelope and hare. The height is about twenty-four inches; the ears are pendulous and silky haired; the tail also silky haired, having been compared to that of a silky haired Setter; the hair of the body, however, is smooth.

VI. The Russian Greyhound.

This dog, like the Deer-hound, hunts by scent as well as by sight. He is swift and stout, and fairly courageous, and is considered a match for the wolf, the wild boar, or bear, when the hounds are hunted in packs. In height he is about 26 or 27 inches; ears short, pricked, but turned over at the tips; the hair not long, but thick; that of the tail long, fan-like, and with a spiral twist. The color of the animal is dark brown and gray.

VII. The Turkish Greyhound.

This dog is described as being small, almost hairless, and rather rare even in Turkey, and probably worthless either as a pet or for any practical use.

VIII. The Irish Wolf-hound.

For a dog differing from the these last mentioned, and superior to the Russian, and to the Scotch Deer-hound, the Irish wolf dog, a true Greyhound, as it existed 200 years ago, may be taken as a type of elegance, combined with great strength, fleetness, courage and tractability. Evelyn, the father of English horticulture, who wrote 250 years ago, describing the savage scenes of the bear garden, says: "The bulldogs did exceedingly well, but the Irish wolf-dog exceeded, which was a tall Greyhound, a stately creature, and did beat a cruel mastiff." Campion, a contemporary of Evelyn describes them as Greyhounds of great bone and limb. Goldsmith relates that he knew one as tall as a yearling calf. There are said now to be no thoroughly pure dogs of this once famous breed.

IX. The Stag-hound..

The Stag-hound is the modern representative of the Talbot, or old English hound used in the chase when large game, like deer, ran wild in the forests of Great Britain. Shakespeare evidently had the Stag-hound in

mind when he described the hounds of Theseus in "Midsummer Night's Dream."

> "My hounds are bred out of the Spartan breed
> So flewed* so sanded†; and their heads are hung
> With ears that sweep away the morning dew,
> Crook-kneed and dewlapped‡ like Thessalian bull;
> Slow in pursuit, but matched in mouth like bells,
> Each under each. A cry more tunable
> Was never hallo'd to, nor cheered with horn."

It is related of this magnificent dog, that in a hunt, the pack being at fault, two dogs took up the chase, and ran the deer from Kingfield park in Northumberland to Annan in Scotland and back, a distance of more than 100 miles. In returning, the deer leaped the wall of the park from which he started, and died. One of the hounds pursued to the wall, and expired, unable to leap the barrier, and the other hound was found dead from exhaustion a short distance in the rear. In 1482, a deer was pursued fifty miles across the country in four hours, by a pack of these hounds without a break; the severity of the pursuit may be understood from the fact that nearly twenty horses died in the chase; but, again, later civilization has rendered these hounds of little practical value.

X. The Fox-hound.

The modern Fox-hound was produced by a cross between the old English hound and the Greyhound. They combine courage, stoutness and fleetness, with great power of scent, and like all dogs that hunt in packs, they give tongue as it is called, (cry out) when on the scent. If the dog, when he finds, is not quite sure, the note is given undecidedly and at intervals; the scent being sure the dog runs open-mouthed, in full cry, and all the other dogs rush immediately to the call, and the whole pack are in full, united cry. There are few more exciting scenes than a pack of hounds in pursuit, giving tongue, with a party of horsemen cheering them on. In England, fox-hunting is the national sport of the wealthy, and in the South it is keenly followed by many of those whose wealth allows them to keep hounds, and participate in the sport. As a guide to those who may fancy these dogs, the following condensation from the National (English) Dog Club Book of Points will be interesting: The head should be light, very sensible, and at the same time full of dignity; with a certain amount of chap, and the forehead a little wrinkled; the neck long and clean, with no approach to dewlap or cravat; the ears set low and lie

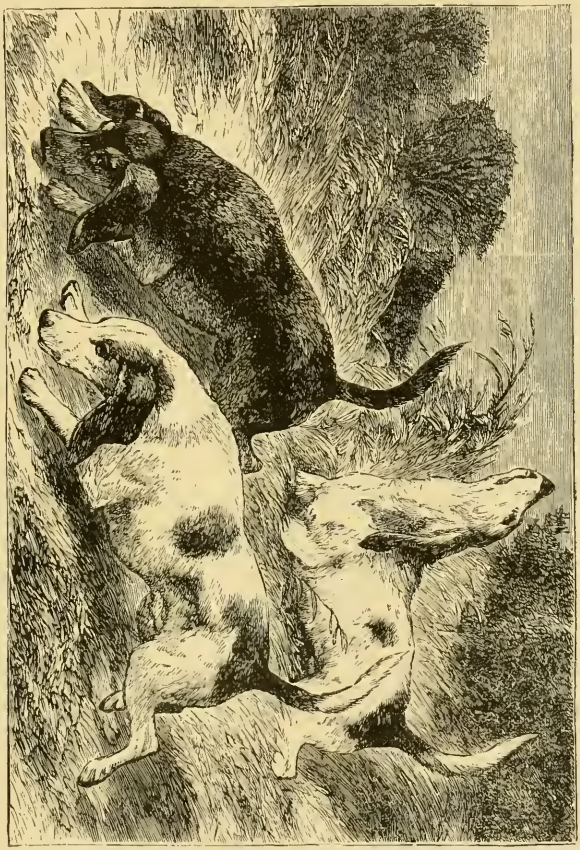
*Note.—Flewed: deep mouthed. Flews are hanging chops, giving the peculiar appearance to the heads of the hounds.

† Sanded: speckled; of a sandy color.

‡ Dewlap: the loose hanging skin of the neck.

close to the head; the shoulders should be long and well sloped back; the chest deep and wide; the elbows in a straight line with the body; the fore legs quite straight, large in bone and well clothed with muscle; the

ENGLISH FOX-HOUNDS.



pasterns or ankles must be large, strong and straight, without turning in or out; the feet round, and rather flat than arched; the division between each toe should be just apparent; the sole of the foot hard and indurated.

The back of the Fox-hound should be straight, wide and muscular; the loins strong and square; the back ribs deep, and the hind quarters powerful. The tail should be carried gaily, but not hooped, nor feathered at the end.

In color, the Fox-hound should, for choice, be black, white, and tan. When the colors blend, the animal is said to be pied. The best pie colors are hare, badger, red and yellow. The coat should be dense, smooth and glossy.

XI. The Bloodhound.

Of all dogs which hunt by scent, the Bloodhound is the most extraordinary for his power of following the trail upon which he is put, combining marvelous power of scent, persistent determination—however the track may have been crossed and recrossed—courage amounting almost to ferocity in the attack, but at the same time when pure, unequalled in faithfulness, gentleness and affection to his master and friends. The breed in its purity is rare, they generally being crossed with the Bull-dog to render them ferocious. It is one of the oldest of English-bred dogs, and has been known as the Sleuth-hound, the Leash-hound, the Slouth and the Slugg-hound, but while bearing the general characteristics of the old English or Talbot hound, it is undoubtedly distinct. When kept chained he is morose and ferocious, as indeed all dogs are, more or less, and at all times he is inclined to be touchy and savage, and never will permit the approaches of strangers. His height will range from 24 to 30 inches at the shoulder. The color a reddish tan, darking towards the head and back, and quite free from white on the face or white patches; but if the brown of the body be flecked with white, it is considered good. In the best type of the English Bloodhound, the coat should be close, silky, short, and strong; the forehead long and narrow; the eyes deep and sunken, but expressive, and plainly showing the *haw* or third eyelid, which gives a peculiar look of redness to the eyes. The ears should be long, thin, and pendant, hanging straight down the sides of the face; if they rise when the dog is excited it shows that there is cross blood in him. The face and upper jaw, to the nose, should be narrow, the nose itself large and black, or nearly black, the lips or flews should be long, thin, and pendulous. In a perfect Blood-hound the ears and the flews are long enough to touch each other when brought under the chin. The neck should be long and strong, the shoulders and fore legs straight and powerful, the feet compact and close at the toes, which should be well split. The skin of the throat should be loose and wrinkled, or what the huntsmen call throaty. The back and loins should be broad, the chest deep and full, the stern tapering, and the tail well set on and

carried in a graceful upward curve. His voice is deep and sonorous, and in pursuit, a full, deep, mellow and prolonged bay. The illustration will give a faithful idea of the pure English Bloodhound, now unhappily rare

THE TRUE BLOOD-HOUND.

from having been so much crossed with other savage dogs. Yet the instinct of the Bloodhound lies simply in one direction, and hence, except for tracking felons and other criminals, they are of but litle use.

XII. The Dachshund.

The German Badger hound, Dachshund, incorrectly called Dashound, is one of the most valuable of dogs for hunting badger, raccoon, and other animals of that class. For foxes, in a country where the hunter waits at a run for a shot, they are of great value, being sure of scent, slow in pursuit, and the most persistent of dogs in following. In the United States they are rare, and in Europe are seldom found except in the kennels of the wealthy. We think that in the South this breed should be of great value for hunting foxes, and as general farm dogs, since it is agreeable, cheerful, of consummate courage, and devoted to the

THE DACHSHUND.

master and family. The Germans have a proverb that where a Dachshund fastens he holds—"*Wo ein Dachshund fangt er halt.*"

The dogs will weigh about 20 pounds; the hair is short and moderately hard, and the skin remarkable for its thickness as well as for its elasticity, so that when seized in fighting, the dog can turn and also seize his adversary by the throat or fore leg. The prevailing colors are black, with tan markings; brown, with tawny markings; fallow red and gray, with blue or brown flecks. The engraving is a faithful representation of this sturdy (some would call him homely) and valuable dog.

XIII. Other Hounds.

The other hounds that may be mentioned are the Harrier, the Beagle, and the Otter-hound. The Harrier resembles the Fox-hound, but is smaller. A cross of the Greyhound upon the Southern hound, and this produce bred again to the Southern hound will bring an excellent dog for hunting hares—for the wild animal we call rabbit is a true hare. This dog is now quite rare in England, and almost unknown in America.

The Beagle.—The true Beagle, like the Harrier, is almost extinct. They may be called small and delicate hounds, in size ranging from 14 inches down to less than ten inches in height. They have long, pendent ears, long bodies, and are more pretty than useful.

The Otter-Hound.—The Otter-hound is a rough, wiry-haired dog, otherwise much like the old fashioned Bloodhound. They are so savage that instances are on record of half a pack being killed in a single night fighting with each other. They are delicate in power of scent, good swimmers, and can endure cold water well. Added to this, they are of the most enduring courage in fighting enemies, and have the peculiarity of biting savagely and deep, and instantly tearing out their hold.

Hunting the hare is thus described by one of the best of English poets:

> "Poor is the triumph o'er the timid hare,
> Yet vain her best precaution, though she sits
> Conceal'd, with folded ears, unsleeping eyes,
> By nature raised to take the horizon in,
> And head conceal'd betwixt her hairy feet,
> In act to spring away. The scented dew
> Betrays her labyrinth; and deep
> In scatter'd sullen openings, far behind,
> With every breeze, she hears the coming storm,
> But nearer and more frequent, as it heeds
> The sighing gale, she springs amazed, and all
> The savage soul of game is up at once."

XIV. The Fox-terrier.

The Fox-terrier was once considered a most useful dog for pulling foxes from their holes of refuge, and was originally kept as an addition to every pack of hounds. This was in the day of slow hounds. Now-a-days the hunting pace is too fast for him. But as his usefulness ceased here, he still held a place, and he is now a fashionable companion for young men of leisure. Their weight is about 16 pounds. The head is flat and narrow between the eyes, but widening up to and between the ears; the ears are set rather back, and lying close to the cheek, and are small and thin; the jaw is strong, smooth, level, and armed with strong teeth; eyes small, black and keen, nose black, shoulder straight, chest

full and round but not deep; neck light and rising finely from the shoulder; back straight, and thighs well bent and powerful. The color is white, with black, black and tan, or with tan markings about the head. The tail is short, and the limbs straight and strong. The coat should be fine but hard, and not at all inclined to silkiness. The cut will give a good idea of this intelligent and really handsome and useful dog.

FOX-TERRIER.

CHAPTER III.

SPORTING OR FIELD DOGS.

1. THE POINTER.——II. THE SETTER.——III. POINTS OF THE ENGLISH SETTER.——IV. POINTS OF THE IRISH SETTER.——V. TRAINING TO WORK.——VI. THE ENGLISH SYSTEM OF TRAINING.——VII. THE ENGLISH RETRIEVER.——VIII. THE CHESAPEAKE BAY RETRIEVER.——IX. THE CLUMBER SPANIEL.——X. THE ENGLISH SPANIEL.——XI. THE IRISH WATER SPANIEL.——XII. THE SPRINGER.——XIII. THE COCKER SPANIEL.

I. The Pointer.

All dogs used in field sports, for finding birds, or as it is termed, for retrieving game, when shot, and also the Newfoundland, the St. Bernard, and many of the long-haired household pets are of the Spaniel class. The Pointer seems farther removed from the type than any other, and yet he belongs to this class. He has the most delicate scent of any of the field dogs, is exceedingly staunch in pointing game, but in the West his feet are not strong enough to stand the sharp stubble of the prairie grasses. All sporting dogs take naturally to the finding and pointing of game, but to make them perfect and reliable, their education must be careful and complete.

They are, all of them, the most intelligent of dogs, and a number of instances are recorded, in which both Pointers and Setters have refused to work longer, when loaned to a person who proved an indifferent marksman. Looking back in astonishment at the bad marksmanship, after a few ineffectual attempts to bring down the bird, they trotted off home, and no coaxings, blandishments or commands could call them back. A case is reported in which a Pointer became so incensed at his master's bad shooting, as several times to have attacked him in a manner not to be mistaken. Many of the Spaniel class will hunt indifferently well, but it is only the well-bred Pointer and Setter that become cataleptic, that is immovable, upon getting the scent of game. It has been said that the original instinct of the Pointer was to steal cautiously up to his game, and then spring suddenly, and his pointing is a modification of this habit acquired by education. This is disproved by the fact that the puppy will point as truly and naturally as old dogs.

Among the most interesting of the anecdotes, showing the immovable staunchness of Pointers upon scenting game is that of Mr. Gilpin who

tells of a brace of Pointers standing an hour and a quarter without moving. This, however, was exceeded by Clio, a dog belonging to a Mr. Lee, who stood with her hind legs upon a gate for more than two hours, with a nest

THE POINTER, COURSING.

of partridges close to her nose. She must have seen them as she jumped over the gate, and had she moved an inch they would have been frightened away. Mr. Lee went on, and, having other dogs, did not miss Clio for

a long time; at length he perceived she was not with the rest, and neither came to his call nor his whistle; he went back to seek her, and there she stood just as she had got over the gate. His coming up disturbed the birds, and he shot some of them, but Clio, when thus relieved, was so stiff that she could not move, and her master sat down on the grass and rubbed her legs till she could bend them again.

Again, as showing the intelligent sagacity of the Pointer, Mr. Jesse, in his "Gleanings," tells the following story: An old friend of mine had a very sagacious Pointer, which was kept in a kennel with several other dogs. His gamekeeper having gone one day into the kennel, dropped his watch by some accident. On leaving the place, he fastened the gate as usual, but had not gone far from it when he heard it rattled very much; and on looking round he saw his favorite Pointer standing with her forepaws against it and shaking it, evidently for the purpose of attracting his attention. On going up to her, he found her with his watch in her mouth, which she restored to him with much seeming delight.

II. The Setter.

The Setter is undoubtedly the most valuable, as it is the most intelligent, of field dogs. His head shows remarkable development of brain, combining intelligence, affection, docility and courage. They have been called timid, and so they are if they have been cowed, but it is a fact that well-trained Setters are among the most watchful and trusty of house dogs, as well as the most reliable in the field. The original colors were dark bay, and white, or else decided chestnut. The English Setter is white, with black or brown marks. The least adulterated are bred in Ireland; and importations into the United States are from the very best of the class both English and Irish.

The Gordon Setter, an English strain, is heavier in build and not so fine in the head as the white and brown English, or the Irish Setter. The color should be quite black, or black with a tinge of brown or tan. The black of the purest animals should be rich and without mixture, and the tan should be a deep mahogany red without any tendency to fawn color. The Irish Setter is of two distinct strains, the red and the white-and-red.

III. Points of the English Setter.

The Skull.—The skull has a character peculiar to itself. It is without the prominence of the occipital bone so remarkable in the Pointer; is also narrower between the ears, and there is a decided brow over the eyes.

The Nose—This should be long and wide, without any fullness under the eyes. There should be, in the average dog Setter, at least four inches

from the inner corner of the eye to the end of the nose. Between the point and the root of the nose there should be a slight depression—at all events there should be no fullness—and the eyebrows should rise sharply

AN IRISH SETTER.

from it. The nostrils must be wide apart, and large in the openings, and the end should be moist and cool, though many a dog with exceptionally good scenting powers has had a remarkably dry nose, amounting in some

cases to roughness like that of shagreen. In all Setters the end of the nose should be black, or dark liver-colored, but in the very best bred whites, or lemon and whites, pink is often met with, and may in them be pardoned. The jaws should be exactly equal in length, a "snipe nose," or "pig jaw," as the receding lower one is called, being greatly against its possessor.

Ears, Lips, and Eyes.—With regard to ears, they should be shorter than the Pointer's, and rounded, but not so much so as those of the Spaniel. The "leather" should be thin and soft, carried closely to the cheeks, so as not to show the inside, without the slightest tendency to prick the ear, which should be clothed with silky hair little more than two inches in length. The lips also are not so full and pendulous as those of the Pointer, but at their angles there should be a slight fullness, not reaching quite to the extent of hanging. The eyes must be full of animation, and of medium size, the best color being a rich brown, and they should be set with their angles straight across.

The Neck.—The neck has not the full rounded muscularity of the Pointer, being considerably thinner, but still slightly arched, and set into the head without that prominence of the occipital bone which is so remarkable in that dog. It must not be "throaty," though the skin is loose.

Shoulders and Chest.—The shoulders and chest should display great liberty in all directions, with sloping deep shoulder blades, and elbows well let down. The chest should be deep rather than wide, though Mr. Laverack insists on the contrary formation, italicising the word wide in his remarks at page 22 of his book. Possibly it may be owing to this formation that his dogs have not succeeded at any field trial, as above remarked; for the bitches of his breed, notably Countess and Daisy, which I have seen, were as narrow as any Setter breeder could desire. I am quite satisfied that on this point Mr. Leverack is altogether wrong. I fully agree with him, however, that the "ribs should be well sprung behind the shoulder," and great depth of the back ribs should be especially demanded.

Back, Quarters, and Stifles.—An arched loin is desirable, but not to the extent of being "roached" or "wheel-backed," a defect which generally tends to a slow up-and-down gallop. Stifles well bent, and set wide apart, to allow the hind legs to be brought forward with liberty in the gallop.

Legs, Elbows, and Hocks.—The elbows and toes, which generally go together, should be set straight; and if not, the "pigeon-toe" or in-turned leg is less objectionable than the out-turn, in which the elbow is confined by its close attachment to the ribs. The arm should be muscular, and the bone fully developed, with strong and broad knees, short

pasterns, of which the size in point of bone should be as great as possible (a very important point), and their slope not exceeding a very slight deviation from the straight line. Many good judges insist upon a perfectly upright pastern, like that of the Fox-hound; but it must not be forgotten that the Setter has to stop himself suddenly when at full stretch he catches scent, and to do this with an upright and rigid pastern causes a considerable strain on the ligaments, soon ending in "knuckling over;" hence a very slight bend is to be preferred. The hind legs should be muscular, with plenty of bone, clean strong hocks, and hairy feet.

THE FEET.—The feet should be carefully examined, as upon their capability of standing wear and tear depends the utility of the dog. A great difference of opinion exists as to the comparative merits of the cat and hare foot for standing work. Fox-hound masters invariably select that of the cat, and, as they have better opportunities than any other class of instituting the necessary comparison, their selection may be accepted as final. But, as Setters are specially required to stand wet and heather, it is imperatively necessary that there should be a good growth of hair between the toes, and on this account a hare foot, well clothed with hair, as it generally is, must be preferred to a cat foot, naked, as is often the case, except on the upper surface.

THE TAIL.—The flag is in appearance very characteristic of the breed, although it sometimes happens that one or two puppies in a well-bred litter exhibit a curl or other malformation, usually considered to be indicative of a stain. It is often compared to a scimitar, but it resembles it only in respect of its narrowness, the amount of curl in the blade of this Turkish weapon being far too great to make it the model of the Setter's flag. Again, it has been compared to a comb; but as combs are usually straight, here again the simile fails, as the Setter's flag should have a gentle sweep; and the nearest resemblance to any familiar form is to the scythe with its curve reversed. The feather must be composed of straight, silky hairs, and beyond the root the less short hair on the flag the better, especially towards the point, of which the bone should be fine, and the feather tapering with it.

SYMMETRY AND QUALITY.—In character the Setter should display a great amount of "quality," a term which is difficult of explanation, though fully appreciated by all experienced sportsmen. It means a combination of symmetry, as understood by the artist, with the peculiar attributes of the breed under examination, as interpreted by the sportsman. Thus, a Setter possessed of such a frame and outline as to charm an artist would be considered by the sportsman defective in "quality" if he possessed a curly or harsh coat, or if he had a heavy head with pend-

ent Bloodhound-like jowl and throaty neck. The general outline is very elegant, and more taking to the eye of the artist than that of the Pointer.

The Hair.—The texture and feather of coat are much regarded among Setter breeders, a soft silky hair without curl being considered a *sine qua non*. The feather should be considerable, and should fringe the hind as well as the fore legs.

Color.—The color of coat is not much insisted on among English Setters, a great variety being admitted. These are now generally classed as follows, in the order given: (1) Black and white ticked, with large splashes, and more or less marked with black, known as "blue Belton;" (2) orange and white freckled, known as orange Belton; (3) plain orange, or lemon and white; (4) liver and white; (5) black and white, with slight tan markings; (6) black and white; (7) liver and white; (8) pure white; (9) black; (10) liver; (11) red or yellow.

IV. Points of The Irish Setter.

The points in which the Irish differs from the English Setter are given as follows. The description applies to the pure reds, but the white-and-reds are identical with them except in color:

The Skull.—The skull is somewhat longer and narrower, the eyebrows being well raised, and the occipital prominence as marked as in the Pointer.

The Nose.—This is a trifle longer, with good width, and square at the end; nostrils wide and open, with the nose itself of a deep mahogany or very dark fleshy-color, not pink nor black.

Eyes, Ears and Lips.—The eyes should be a rich brown or mahogany color, well set, and full of intelligence; a pale or gooseberry eye is to be avoided. Ears long enough to reach within half an inch or an inch of the end of the nose, and, though more tapering than in the English dog, never coming to a point; they should be set low and close, but well back, and not approaching to the hound's in setting and leather. Whiskers red; lips deep, but not pendulous.

The Body.—In frame the Irish dog is higher on the leg than either the English or black-and-tan, but his elbows are well let down nevertheless; his shoulders are long and sloping; brisket deep, but never wide; and his back ribs are somewhat shorter than those of his English brethren. Loin good, slightly arched, and well coupled to his hips, but not very wide; quarters slightly sloping, and flag set on rather low, but straight, fine in bone, and beautifully carried. Breeders are, however, going for straight backs like that of Palmerston, with flags set on as high as in the English Setter.

THE LEGS.—Legs very straight, with good hock, well-bent stifles, and muscular but not heavy haunches.

THE FEET.—The feet are hare-like, and moderately hairy between the toes.

THE TAIL.—The flag is clothed with a long, straight comb of hair, never bushy or curly, and this is beautifully displayed on the point.

THE COAT.—This should be somwhat coarser than that of the English Setter, being midway between that and the black-and-tan, wavy but not curly, and by no means long. Both hind and fore legs are well feathered, but not profusely, and the ears are furnished with feather to the same extent, with a slight wave, but no curl.

THE COLOR.—The color should be a rich blood red, without any trace of black on the ears or along the back; in many of the best strains, however, a pale color or an occasional tinge of black is shown. A little white on the neck, breast, or toes, is by no means objectionable, and there is no doubt that the preponderance of white, so as to constitute what is called "white and red," is met with in some good strains.

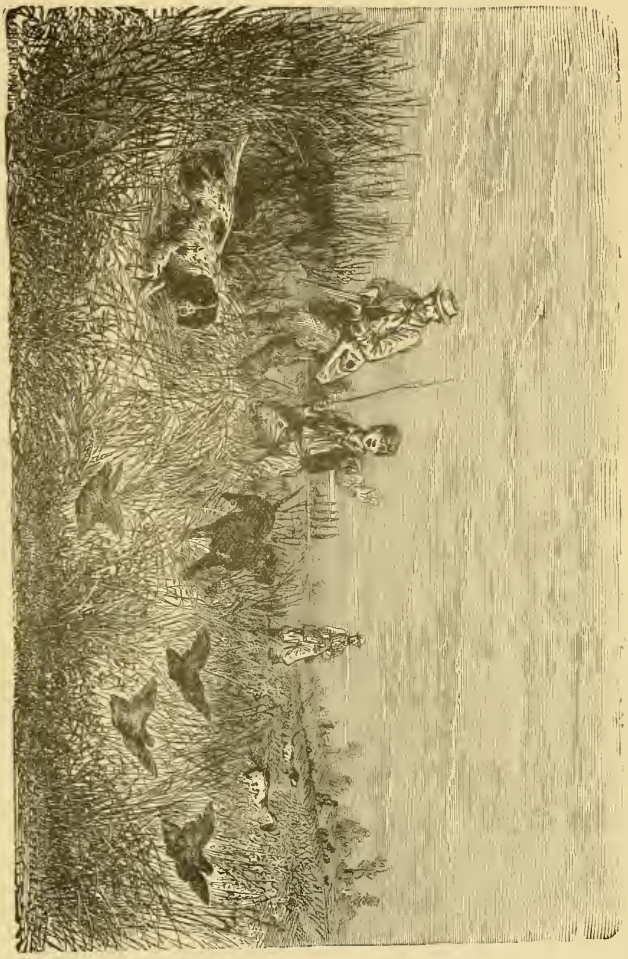
V. Training to Work.

The training of the Pointer and Setter is identical. They are quick to learn, and should not be unduly punished, for it is only perseverance and care in training that make the perfect dog. Professional trainers are apt to be brutal and too severe, therefore once the dog is fairly way-wise, the owner had better finish the training himself. In shooting on the prairies, but little trouble will be experienced, though to make the most of any dog, tact and patience are required as well as experience. They must be made to obey, and if they are stubborn and willful, aside from natural high spirits, they must be punished, and that always with the whip, never with the ram-rod or gun. It does not pay to run the risk of breaking the gun in an insane attempt to break the dog. Always use the same words for any given command; these as generally used are as follows: To prevent breaking over a fence or barrier—"Ware fence;" to cease chasing cats, hares, poultry, etc.,—"Ware chase;" to come to heel, and walk quietly behind the master,—"To heel," or "Heel;" to run or course forward,—"Hold up;" to lie down,—"Down charge," or "Down;" to prevent taking food placed near, or to prevent running in on birds,—"Toho." If the dog is too full of spirits, a light cord twenty or thirty feet long trailing behind him, will soon sober him.

VI. The English System of Training.

The training of bird dogs, where the fields are small, especially in England, where manors must not be tresspassed on, is more difficult. Upon

this subject a competent English authority says: The education of the



GROUSE SHOOTING ON THE PRAIRIES.

Pointer, and of the Setter also, has only to be carried up to the point at

which it was compelled to stop, for want of the gun; and that there are some few essentials in regard to which it requires finish. The "Down-charge" is dependent upon the rising of the birds, and can better be taught at pairing-time; but, however well inculcated, is too apt to be forgotten, and to be lost sight of, in the anxiety to bag the game. The Pointer or Setter should not be used as a retriever; another dog should be specially set apart for that purpose. If this is not the case, the chances are ten to one that the young dog is allowed to go to his bird, if a runner, without waiting for his master's order. If this is done once or twice, the habit soon increases, till at length both dogs rush at their bird, in their anxiety to retrieve it. The "gillie" should have charge of the dogs at this critical moment, and he as quietly as possible should keep them steadily down. This is all he has to do at that moment, though he may well do that and mark at the same time. He may also lead the retriever, till he is steady enough to walk at your heels. His grand use, however, is to keep the dogs down when the birds rise, and this he should do under all circumstances.

Dogs do not require to mouth their game as an encouragement; they are quite satisfied if they see it fall, and will continue the work as long as their strength will allow, without touching a feather. By adhering strictly to this plan, all danger of their acquiring this inexcusable fault is done away. If any dog is wanting in self-confidence, be careful in following him up, pay great attention to his point, and take care to shoot his bird, if possible; or, at all events, to shoot at it. In this way, the dog finds that you estimate him higher than he thought, and he learns to depend on his own powers, instead of following another dog, and always looking out for "points." In grouse-shooting, there is not the annoyance of the constant hedges, which are so detrimental to the Pointer in the pursuit of the partridge; but there is a much greater chance of the dog pottering over a foot-scent, because the grouse runs so much more than the partridge, and being feathered down the leg, his foot-scent is so much stronger.

It is here that a good Setter shows his superiority, as he generally makes out a foot-scent better than a Pointer; though I have seen Pointers that would make out anything. The very highly-bred Pointer often has no notion of this; he points as stiff as a Chinese idol the moment he comes upon scent of any kind, and nothing will move him as long as that scent continues. Such dogs are useless on the moors. You not only want to know that there is game somewhere, but also where it is. The essential feature of a good dog is, that he shall stop the moment he feels the scent, and satisfy himself that game is before him. As soon as he is quite sure of this, he should wait until you are within distance; on being assured

of which, he should draw upon his birds, if they are running, taking care to stand quite steady if he hears the faintest "Toho" from his master. This is sometimes necessary if the grouse are strong runners, as the shooter must often head them before they will rise, though good sportsmen prefer walking rapidly up to them, and putting them up, as they will seldom, till they are become very wild, get far enough before you to rise out of shot. Some dogs learn to leave their first point, and go round and circumvent their game; but this is only a rare accomplishment, and is scarcely to be desired; it is much better to send your man well on before them, ordering him to drop to the ground the moment they rise.

VII. The English Retriever.

Retrievers proper are cross-bred dogs. The English Retriever is a cross between the Irish Water Spaniel and the Newfoundland, the object of the cross being to make them stout enough to bear heavy game like hares and large birds, and to impart endurance in cold water. They are generally curly, but whether curled or smooth haired, the color should be black, or black-and-tan, or black with tabby or brindled legs. The cross with the Spaniel and short, flat-coated St. John's Newfoundland are said to make the best dogs. They have wonderful intelligence, a soft mouth, strength to carry, and are thorough swimmers.

Mr. Cobbett, an English authority, describes the Retriever as follows: He should have a long head, a large eye, a capacious mouth. His ears should be small, close to his head, set low, and with short hair on them. His nose should be large, his neck long, that he may stoop in his quest, his shoulders oblique and deep, and his chest broad and powerful. His loins, back, and hind quarters are all of great importance; for though a hare will be the maximum of weight he will have to carry, he may have to carry it a long distance, to get over a stone wall with it, or to make his way through a strong covert. His legs should be strong, straight, and muscular; his feet round and moderately large, with the toes well arched. If he be required for punt-shooting, his coat should be short and close; but for general purposes it should be flat, shining, and abundant. If black, he should be all black; if black and tabby, the tabby should not go far up the leg, and should be free from white. The tail should be well feathered, moderately short, and carried gaily. The feather should be decidedly heavy, but tapering to the point.

No Retriever deserves the least consideration from a judge at dog shows unless his temper is good. Temper is the foundation of a good Retriever. He should be about 24 inches at the shoulders, moderately long in the body, and fairly short on his legs. He should be as clean cut

as a Setter under the angle of the jaw. The Setter cross is said to be the best, but it certainly diminishes the liking for the water, and, in some

ENGLISH RETRIEVER.

instances, the produce has a marked disinclination to quest in thick or tangled woodland.

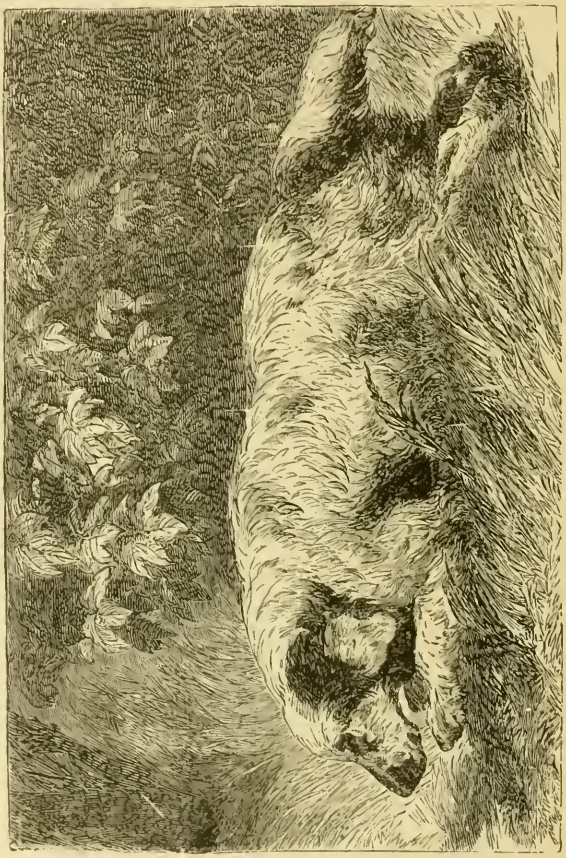
VIII. The Chesapeake Bay Retriever.

There are three strains of these noble dogs: 1st, the Otter breed, of a tawny sedge color with very short hair; 2d, the Red Winchester, a

CHESAPEAKE BAY RETRIEVER.

dog with long, smooth hair; and 3d, the Curly Retriever, having curled hair and of a red-brown color. A white spot in the breast of either class is not considered a disqualification.

They are said to have sprung from a pair of Newfoundlands, secured from a wrecked ship in 1807. Gov. Lloyd, of Maryland, into whose pos-



CLUMBER SPANIEL (ENGLISH.)

session the dog came, trained him carefully, and "Sailor," as he was called, gave origin to the progeny known as the Sailor breed. The bitch

also became famous as a staunch retriever of ducks and other game, and crossed with the Irish Spaniel they have since become famous. The Maryland Poultry and Fancier's Association, at the first show held at Baltimore in 1877, appointed a committee to draw up a standard of points for judging this breed.

As showing the tractability and intelligence of the Retriever, the following anecdote related by Mr. Cubbett, of a dog belonging to his friend Sir Charles Taylor, will suffice. He says the sagacity of this dog was extraordinary. Sir Charles would send him out in the morning to see if the weather would suit for shooting, saying, "Go out and see if it will do." The dog would go out, walk round the house, putting his nose up in the air for a few moments, and then come back to the house. If "it would do," he would jump up on his master's knees and spring about the room in the most lively manner. Sir Charles would then tell him to fetch Tom, the keeper. Off he would go, sometimes to the distance of about a mile, to fetch the keeper. He would scrape at the keeper's door, run towards the corner where the guns were kept, and by delighted barks tell Tom that he was wanted to go out shooting. And then they would both be soon ready for the day's sport. If, on the contrary, "it would not do," the dog would come in slowly, looking down on the carpet in a dejected way, throw himself at length on the rug, and go to sleep.

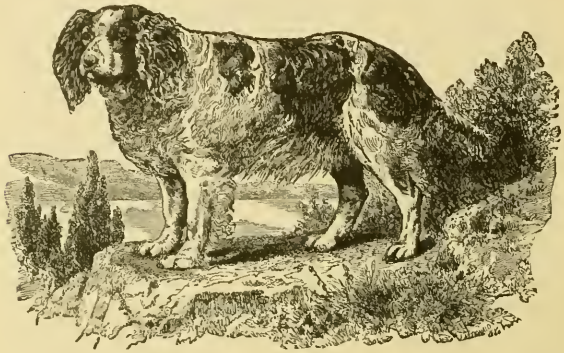
IX. The Clumber Spaniel.

In England, where peculiarities of breeds are accurately looked to in the hunting of game, the Clumber Spaniel is used for partridge shooting. This dog remains perfectly mute, even on the hottest scent, his great merit being his silence, so that he becomes valuable with game that takes wing at the slightest noise. He is thought to be an improved type of the old English Springer or Cock-flusher. The Clumber is sagacious, strong, slow in hunting, and easily gets through underbrush. His color is pale yellow and white, or orange and white, the white always being the prevailing color. He is large-boned with great length of body; the head large; the eye full and expressive; hair short and exceedingly thick, and the tail fully feathered.

X. The English Spaniel.

The old English Spaniel is one of the best of water dogs, never refusing when there is game, and a capital swimmer and diver. His nose is excellent, and his intelligence high, but he is rather restless, and wants to be kept under good subjection. As a hunting dog, he is now but little

used, but he has been so highly bred, that he has become an exceedingly handsome and companionable dog, especially the smaller and fine breed —for there are two varieties as there are of the Irish Water-Spaniel. The illustration shows one of the most perfect specimens of the breed.



ENGLISH SPANIEL.

XI. The Irish Water-Spaniel.

Irish Water-Spaniels are of two varieties. Those of the South of Ireland, are uniformly of a pure liver color; ears long and well feathered, sometimes two feet across from the point of one ear to the point of the other; the hair consists of short, crisp curls; the body long, strong and low; the tail round, and carried slightly down, but straight and without being at all feathered.

The North of Ireland Spaniels have short ears, with but little feather on them, or on the legs; the coat is somewhat curled, and liver-colored, but with considerable white, so much so, sometimes, as to make him really liver-colored and white. The pure liver-colored dogs of the South of Ireland, are most highly prized, as are those having a well-defined top knot, not straggling across, but coming down in a peak on the forehead.

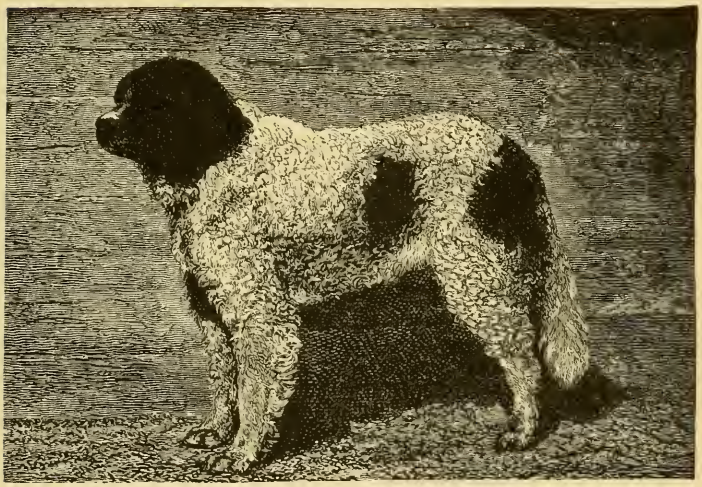
XII. The Springer.

The Springer, like the Clumber, is a stout, slow but heavy dog, and is not adapted to hard work. Many of them are mute, and this, in connection with their acute and discriminating sense of smell, their tractable temper and the ease with which they may be managed, renders them well

adapted to beating small coverts. On wild woodlands of thick underbrush or on the woodland openings, the Clumber would be the best for partridges.

XIII. The Cocker Spaniel.

The term Cocker is generally used to designate every field Spaniel except the Springer and Clumber, so the varieties are innumerable. The Cocker is higher in the leg than either the Springer or Clumber, more active, and apt to be wild, but nevertheless a useful dog in England when well broken. The colors are various; liver-and-white and black-and-white being common, though lemon-and-white, self-colored liver, black, and even black-and-tan are sometimes met with.



NORTH IRISH WATER-SPANIEL.

CHAPTER IV.

WATCH DOGS.

I. HOUSE WATCH DOGS.——II. THE MASTIFF.——III. THE BULL-DOG.——IV. THE BULL-TERRIER.——V. THE NEWFOUNDLAND DOG.——VI. THE ST. BERNARD DOG.——VII. SHEPHERD DOGS.——VIII. THE SCOTCH COLLIE.——IX. THE SPANISH SHEPHERD DOG.——X. THE DROVER'S DOG.——XI. THE POMERANIAN OR SPITZ DOG. XII. THE GERMAN SHEEP DOG.

I. House Watch Dogs.

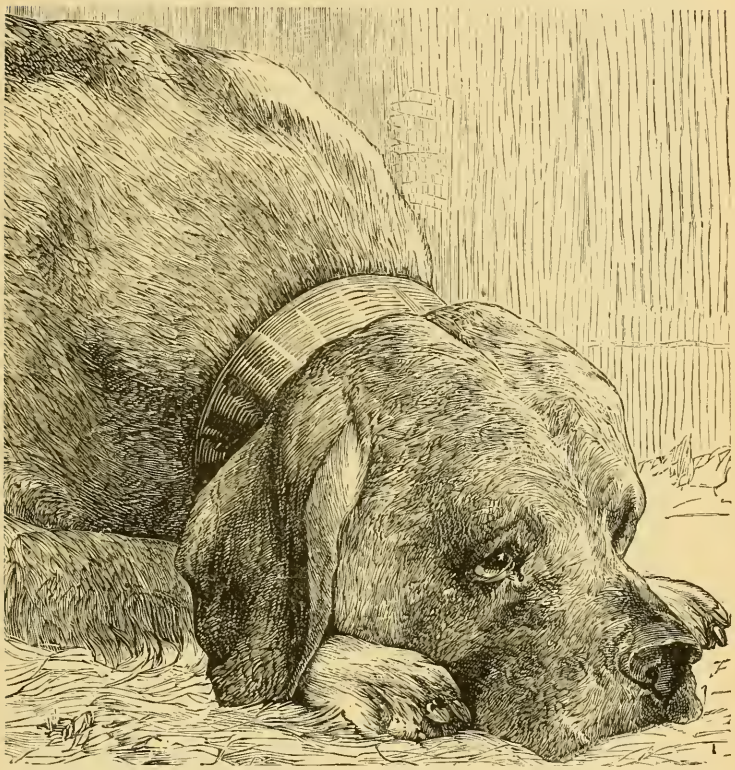
Dogs kept in or near the house, whose duty it is to guard property, are known as guard or watch dogs. As a rule, these are the veriest curs of mixed breeds, and of but little value for the purpose for which they are kept. If the property to be guarded requires a large, strong dog, that will inspire fear, the Mastiff is undoubtedly the best; but those of pure breed are difficult to get, and, of course, no dog is a sufficient protection against professional thieves. When the care of children is a part of the duty required, the Newfoundlands or St. Bernards are the best, since their natural instinct lies in this direction. If unswerving courage, fidelity, refusal under any circumstances to make friends with strangers, and prompt watchfulness in giving the alarm are what is required, the pure Bull-terrier is one of the most useful of dogs. The Bull-dog proper is of no value whatever simply as a watch dog, but is useful as a cross on more intelligent dogs to increase their courage and tenacity of purpose. For guarding flocks and herds, and as aids in driving them from place to place, the Shepherd dog and the Drover's dog, in their several varieties, are all that could be desired.

II. The Mastiff.

This noble dog is of great antiquity in the British Islands. Unfortunately the pure Mastiff is one of the rarest of dogs, many of the so-called Mastiffs being simply smooth-haired mongrels of great size. The true Mastiff is docile, intelligent, honest and trustworthy, courageous, but not ferocious, grave, sometimes sullen-looking, but vigilant: a dog, withal, which nothing can tempt from his duty.

In the sixteenth century—nearly 300 years ago—Conrad Herebatch thus describes him: "Neither too gentle nor too curst, that he neither faune upon a theefe nor flew upon his friends; very waking; no gadder

about, nor lavish of his mouth, barking without cause; neither maketh it any matter though he be not swift, for he is but to fight at home and give warning to the enemie." Their rarity is caused by their immense size and consequent cost of keeping, added to the fact that modern safeguards for the protection of property have, in a measure, superseded their



MASTIFF AND BLOODHOUND CROSS.

use. Still, their habit of silence renders them exceedingly valuable in guarding hunters' camps, and for all situations where the dog is expected to give assistance in an encounter they are invaluable. If crossed with the Bloodhound or Newfoundland, the progeny is apt to be ferocious, and crossed with the Bull-dog they are often savage brutes. Hence,

every big brown dog must not be taken for a Mastiff; the illustration shows the head and shoulders of a Mastiff crossed with a Bloodhound.

Over forty years ago, as a boy, the writer used to hunt with such a dog and a finely-bred Greyhound, and many a prairie-wolf and deer have we carried home on the saddle as the result of the chase. The Mastiff was quiet enough at home, never molesting strangers nor the farm stock, but once aroused at the sight of game he was ungovernable. No game native to Northern Illinois but he had killed, an eight-pronged buck, otter, wild hogs, wolves innumerable, and a full-grown cat, being the trophies of his individual prowess; for the Greyhound was simply fleet enough to overtake, but without the courage to attack, or even participate in the struggle. Hare alone would he pick up, and these could seldom double on him. He seemed when coursing them to be rolling like a hoop; suddenly his head and lithe neck would swerve to one side, the hare was seized, and the trophy carried to the Mastiff to kill. As showing the tenacity and great courage of this Mastiff, he killed, without help, a full-grown wildcat, of the short-tailed species, after two successive struggles, one in the dense thicket, where the cat broke from him. On the edge of a ravine the cat attempted to enter a hole, but the dog was too quick for her; seizing her by the rump they both rolled to the bottom, and so fierce was the commotion that it was impossible for me either to shoot or get near. At length the Mastiff seized the cat by the back and then made short work with her. She measured three feet eleven inches from the nose to the tip of tail, the tail being seven inches in length. After the battle, the Mastiff looked as if he had been dipped in blood, the claws of the cat having scored him from end to end.

III. The Bull-Dog.

Whatever the British Bull-dog may have been in other days, he is now valuable for only two purposes, viz: blind ferocity in fighting—if this may be considered valuable—and for crossing upon other more tender-mouthed dogs, to give them grip and holding qualities. Thus, as before observed, the cross upon the Terrier makes a most valuable dog. The illustration shows the characteristics and form of the pure-bred English Bull-dog perfectly—sullen ferocity, combined with great muscular power.

The points of the true Bull-dog are summed up by a Sporting English authority, as follows: A Bull-dog cannot be too wide across the chest, but his loins should be gradually tapering; with the barrel or ribs quite round, a slight fall behind the shoulders, the spine well arched, and rising gently to the stern, which should be full and thick, joined well to the loins, and with a downward tendency to the tail.

The tail should be fairly long, but not too long; straight, fine, and

ENGLISH BULL-DOG.

slightly curved towards the tip. The curve known as a "ring tail," and

that called a "screw tail" are both objectionable, and lessen the value of the dog. The tail should always be set low on the body, and be carried straight, and never hanging down, which latter point is considered a sign of poor blood; as also is the directly bony "rat tail." The legs should be short and well bowed, as very straight legs, especially fore-legs, show a want of strength. The elbows should project, and the hind-legs should be rather longer in proportion than the fore, so as to raise the loins. The hocks, or hamstrings, should be straight, and the stifles, or joints of the hind legs, not turned out. The toes of all the four feet should be even and not allowed to turn out. All the toes should be small, and well split up, so that the Dog has a good firm footing without the toes turning either in or out.

The coat should be fine and smooth. Its color is not of much consequence, but it should be unmixed, either red or red-smut, fawn, or fawn-smut, blue or blue-smut, or white. A little black is no deterioration.

In weight, the Bull-dog may vary from 10lb. to 70lb., but, whatever his weight, he should be muscular without being fat; strong without being bulky; courageous without savage ferocity; sagacious, open-eyed, loud-tongued, and not too affectionate; for, as Mr. Mayhew says, the Bull-dog most given to show its fondness is least to be depended on.

IV. The Bull-Terrier.

The perfect Bull-terrier has been defined as containing just so much of the Bull-dog cross, as to combine the full head, strong jaws, well de-

ENGLISH BULL-TERRIER.

veloped chest, powerful shoulders and thin fine tail of the Bull-dog, with the light neck, active frame, strong loin and full hind-quarters of the

Terrier. This gives them great stamina, good running powers, and a height varying from ten to twenty inches. Half-bloods make fighting dogs, while somewhat less blood of the Bull, will produce a dog that will easily learn tricks, that will fetch and carry well, take water like a Spaniel, hunt all day, and fight to the death, and at the same time with calm courage. They are obedient and good tempered, owing to intelligence combined with affection, and with a courage that never gives in. This is the English Bull-terrier, that by careful breeding and selection for generations, leaves but little to be desired as a house dog, or one that will show his value either in the yard or in the field, hunting and destroying all that class of predacious animals infesting the farm. The illustration represents one of the best of the breed.

The color most sought is pure white, or white patched with black; equally good dogs, however, may be patched blue, red fawn or brindle. Black-and-tan or self-colored red are not so desirable. There should not be any projection of the under jaw, crooked fore-legs, or small or weak hind-quarters; for until these entirely disappear, the Terrier cross should be continued.

As an instance of the intelligence and understanding of the Bull-terrier, the following from Sir Walter Scott will be interesting: "The wisest dog I ever had, was what is called the Bull-dog terrier. I taught him to understand a great many words, insomuch that I am positive that the communication betwixt the canine species and ourselves might be greatly enlarged. Camp once bit the baker, who was bringing bread to the family. I beat him, and explained the enormity of his offence; after which, to the last moment of his life, he never heard the least allusion to the story, in whatever voice or tone it was mentioned, without getting up and retiring into the darkest corner of the room with great appearance of distress Then if you said, 'The baker was well paid,' or 'The baker was not hurt after all,' Camp came forth from his hiding-place, capered, barked, and rejoiced. When he was unable, towards the end of his life, to attend me when on horseback, he used to watch for my return, and the servant used to tell him 'his master was coming down the hill, or through the moor,' and although he did not use any gesture to explain his meaning, Camp was never known to mistake him, but either went out at the front to go up the hill, or at the back to get down to the moor-side. He certainly had a singular knowledge of spoken language."

V. The Newfoundland Dog.

There are three classes of Newfoundland dogs, considered pure, besides the many long-haired mongrels that pass for Newfoundlands

among those ignorant of this truly magnificent breed. These are: 1. The true Newfoundland. 2. The Large Labrador. 3. The St. John's, or smaller Labrador.

The Large Labrador, is more loosely built than the true Newfoundland, and the coat is more or less mixed with white. The hair is longer, more woolly, and curly.

The St. John's Newfoundland is a dog seldom over 24 inches high, and often less. The head is proportionally larger: the ear fuller: the neck larger, and the body much more compact: the hair shorter, glossy and not woolly. The color should be jet black. The limbs and feet of this strain are most excellent. It is this dog, crossed with the Water Spaniel that makes the best Retrievers.

The true Newfoundland is the perfect type of dog intelligence and sagacity, combined with courage, affection and devotion to his master and his friends. He has but one disability as a house dog: if not carefully washed once a week with soap and water, and as carefully brushed every day with a hard brush, the odor is most disagreeable. Thus attended to, the skin is kept perfectly clean and the objection is removed.

The characteristics of the true Newfoundland are graphically described by a surgeon of the English navy. We have owned a number of them bred pure, and will vouch for the accuracy of the description: The head of a Newfoundland is remarkably grand and full of character, and its expression very benevolent. Across the eyes the skull is very broad, and he has a large brain. The forehead is frequently wrinkled: the eyes are small, but bright and intelligent; they are generally deeply set, but should not have a blood-shot appearance. The ears must be small, smooth, set low, and hanging close: they are very seldom set up, even when the animal is excited. Nose and nostrils large: muzzle long and quite smooth: mouth capacious: teeth level.

The neck is naturally short. It is well clothed with muscle, as are the arms, legs, and fore-hand; but there is a slackness about the loin, which accounts for his slouching and somewhat slovenly carriage.

He is frequently short in his back ribs, and some of the largest dogs have a tendency to weakness in the back.

The feet are long and strong, but the sole is not so thick as that of a well-bred Pointer, nor are the toes so much arched as in the average of hunting dogs. This peculiar structure of the foot is adapted for his sledge work on snow, and accounts for his power in the water, and has given rise to the vulgar error that he is 'semipalmated.'

The shaggy-coated Newfoundland has a smooth face, but within two inches of the skull the coat suddenly elongates, and, except that he is

very clean to the angle of his neck, he is thoroughly feathered in his outline. His coat generally parts down the back, and this parting is continued to the end of the tail, which is bushy and carried very gaily. His hind legs are closely-coated from the hock, and his feet all round are nearly as free of feather as a cat's.

THE NEWFOUNDLAND DOG.

The color is generally black; and a brown, or brindled tinge is a valued characteristic of the true breed. The black and white is not considered so good.

In form he is colossal. He has been known to reach thirty-four inches in height, and he is frequently to be found from twenty-eight to thirty inches, or even more.

That the more intelligent dogs have the power of reason in a high degree, there is no doubt. We once had a noble Newfoundland, who constituted himself a kind of police among dogs. He would walk among a crowd of fighting dogs and throw them right and left, and if they attacked him, he killed—his prowess in one afternoon accomplishing the death of three dogs in succession which had attacked him. Usually he was calm and serene, any child being perfectly safe with him. If attacked by a person with a stick, he invariably seized it, and *kept* it. A little pet fox-terrier used to bother him unmercifully by fawning upon him and leaping up in front of him to bar his progress. One day he started for the barn to inquire into some fancied trouble there, and the terrier annoying him as usual, he seized her and walking to the horse trough, gave her a good ducking, notwithstanding her frantic shrieks for help, and then setting her on her feet, pursued his way without further notice.

Another Newfoundland also showed a true reasoning faculty. He used to play ball with the children; they throwing a soft ball into the air, it was his aim—generally successful—to catch it before it reached the ground. One day a croquet ball of wood was thrown and he caught it to the injury of his teeth. Never after that would he catch a ball until it had struck the earth and rebounded. A favorite sport with the children was to throw a slipper from an upper window, and get the dog to bring it back up stairs, to do which he was obliged to pass entirely around the house. One day the lower window, in the side from which the slipper was thrown, was open. In rushing past he caught sight of it, stopped suddenly, leaped in, went through the house and so up stairs.

VI. The St. Bernard Dog.

The dogs of St. Bernard, an Alpine hospice, kept by the Monks of St. Bernard, Switzerland, have long been famous for their sagacity in tracking out benumbed travellers in the snow. They are trained to carry wine, provisions and clothing, on their life-saving expeditions. Traversing the snowy waste in every direction, they discover the traveller, however deeply he may be buried in the snow, and by a long, sonorous howl, notify the monks, who come to their assistance. If the traveller be able, the dogs allow the clothing and provisions to be taken from their custody and appropriated. The "Good Dog Barry" has become world-famous, and his stuffed skin, standing with bottle and collar about his neck, is preserved in the Museum at Berne. The lives of forty persons are said to have been saved by this noble and sagacious dog.

The characteristics of the St. Bernard dog are as follows: Head large, majestic, and full of character; eyes deeply placed, and with a furrow between them extending up the skull; lips pendulous; coat hard, smooth and fleecy; tail bushy and carried handsomely; feet round and arched; toes broad; temper amiable; the countenance noble, but with an air of sorrow. The general shape is symmetrical, and the gait stately; the height is

ST. BERNARD DOG.

from twenty-eight to thirty-one inches, and the length, including the tail, six feet. There are two varieties, one long-haired the other smooth. The rough-haired variety is most sought when of a deep tawny brindle, relieved with some white. The smooth-haired dog is red-and-white, or brindled-and-white, a broad, peculiar white collar distinguishing the dogs of purest breed.

VII. Shepherd Dogs.

There are many so-called Shepherd dogs. Many varieties of dogs containing an infusion of Spaniel blood, and even Cur dogs, may be taught to watch flocks and herds, and every country where sheep are kept has its individual and even local breeds. In England and in the United States, the herdsman's favorite dog is the Scotch Collie. The Drover's dog is similar to the Collie—that is, he should be of the Spaniel class; and the celebrated Spanish Shepherd dog possesses the same characteristics, but is in every way larger and stronger, since he sometimes has to cope with wild animals.

VIII. The Scotch Collie.

The Shepherd dog is required to be sagacious, good tempered, and obedient. He must accomplish his purpose more by coaxing than by

driving, especially in the case of sheep; he must head off a wandering sheep, and thus prevent its going forward, never seize it and force it back.

> "Honest and careful, looking for no praise,
> The Sheep-dog guards the flock. Companion, friend,
> Protector, all in one; a kindly word,
> Or smile, is ample payment for his toils."

The best color is black, with no white except on the throat and limbs; black-and-tan is also regarded as valuable. In shape the body is elegantly formed, and amply clothed with long, thick, woolly hair. The legs and feet are strong; the tail is long, gently curved, and bushy. Like the English Sheep-dog, the Collie has one and often two dew claws on each hind leg. As house-dogs they are quite as valuable as they are in the field.

SCOTCH COLLIE.

A single instance showing the inherent instinct of the Collie must suffice. It is recorded by Ettrick Shepherd—the poet Hogg—and relates to his dog Sirrah, and is as follows: On one occasion seven hundred lambs broke up in an evening, and, scampering off in three divisions, soon lost themselves among the neighboring hills. Sirrah seemed to understand that this large flock of lambs ought not to be absent from their accustomed dwelling-place at night, and, without orders from his master, set off in search of them. The night was dark, and the shepherd and his companion spent the whole of its long hours in scouring the hills, but they could obtain no trace either of the seeking dog, or of the recreant flock. "On our way home, however," says Mr. Hogg, "we discovered a lot of lambs at the bottom of a deep ravine, and the indefatigable Sirrah standing in front of them, looking around for some relief, but still true

to his charge. The sun was then up, and when we first came in view, we concluded that it was one of the divisions which Sirrah had been unable to manage, until he came to that commanding situation. But what was our astonishment, when we discovered that not one lamb of the whole flock was wanting! How he had got all the divisions collected in the dark is beyond my comprehension. The charge was left entirely to himself from midnight till the rising sun; and if all the shepherds in the forest had been there to have assisted him, they could not have effected it with greater propriety."

IX. The Spanish Shepherd Dog.

In Spain, a larger, stronger, and swifter dog is employed to watch the mountain flocks. It is sometimes called the wolf-dog, but it is quite unable to cope with this animal, though it will fight savagely when necessary. It is a clean, long-limbed dog, of medium length of hair and

SPANISH SHEPHERD DOG.

somewhat wolfish in his general appearance, but nevertheless a true dog, and undoubtedly without any wolf blood in him—partaking more of the Setter type, a dog said originally to have come from Spain. The cut will perfectly illustrate this dog.

X. The Drover's Dog.

The Drover's dog is a modified Shepherd dog, larger, stouter, and generally of mixed breed, the Shepherd, however, largely predominating. Newfoundlands are said to make an excellent drover's dog, but they do not stand the heat well. Any good-footed dog, that is tractable, and that will stand the heat, is used in the United States, since their work lies mostly in the summer season. For general purposes on the farm, especially when sheep are kept, the Collie is, to our mind, altogether best. When they have been carefully trained, their sagacity, even under the most trying circumstances is truly surprising, as the following well authenticated performance of a female dog, belonging to a shepherd of Perthshire, Scotland, will show: "The man had bought for his master, at Falkirk, four score of sheep, which he immediately despatched home under the care of his dog alone, a distance of seventeen miles, through a populous country. The poor animal when but a few miles on the road dropped two whelps, but, faithful to her charge, she drove the sheep on a mile or two farther, then allowing them to stop, returned for her pups, which she then carried about two miles in advance of the sheep. Leaving her pups here she returned for the sheep, and drove them on a few miles; and this she continued to do, alternately carrying her young ones and taking charge of the flock, till she reached home. The manner of her acting on this trying occasion, was afterwards gathered by the shepherd from various individuals who had observed these extraordinary proceedings of the poor animal on the road. Although she brought every sheep of the flock safely home, yet it is painful to add, that she did not succeed in bringing her offspring home alive."

XI. The Pomeranian or Spitz Dog.

In his native country, the Pomeranian dog is employed in the care of sheep, and in one respect, and that alone, he is superior to the Collie. He has no aptitude for game; unlike the Collie he is cowardly, but, at the same time, snappish, and again, unlike the Collie, he has no head for learning mere tricks. In the United States, under the name of Spitz dog, they have been largely introduced as pets. They are exceedingly cleanly in their habits, and sweet in breath and body; hence their popularity. But they are never safe with children, and their bite is thought to be dangerous. They are also accounted to be particularly subject to rabies. They have an exceedingly long, smooth, uniform coat of hair, and when bred in perfection, should be prick-eared, pure white in color, and the tail carried directly over the back.

XII. The German Sheep Dog.

This is a small-sized dog, resembling the Spitz, carrying his bushy tail directly over his back. He is a dog with short muzzle, shaggy hair, tractable, vivacious, affectionate, and is said to be excellent in his vocation. As a pet dog, he is altogether safer than his near relation, the Pomeranian dog.

CHAPTER V.

PET AND TOY DOGS.

I. THEIR DIVERSIFIED CHARACTER.——II. THE BLACK-AND-TAN TERRIER.——III. THE SCOTCH-TERRIER.——IV. THE YORKSHIRE-TERRIER.——V. THE SKYE-TERRIER.——VI. THE MALTESE DOG.——VII. THE ITALIAN GREYHOUND.——VIII. THE POODLE.——IX. THE KING CHARLES SPANIEL.——X. THE SHOCK DOG.——XI. THE LION DOG.——XII. THE BARBET.——XIII THE PUG DOG.

I. Their Diversified Character.

Man's ingenuity and tact in the breeding of animals is no where so fully shown as in the breeding of toy dogs, unless it be in the breeding of pigeons. In the latter the results are seen in the diversity of form and color of the plumage. In dogs the most wonderful diversity in shape, texture of hair, and color has been obtained, but most curious of all is the diminutive size to which they are bred. No better exemplification of this can be given than a comparison between a Toy-terrier weighing three or four pounds, and the huge Mastiff or Newfoundland weighing up to 180 pounds. So widely, also, do they diverge from the true dog type, that none save the anatomist would believe that they belong to the same species.

II. The Black-and-tan Terrier.

The Black-and-tan is one of the most elegant of diminutive dogs. Those intended for useful purposes are generally bred to weigh fifteen or sixteen pounds, but the toy varieties, perfect in every respect except size, have been bred down to a weight of three and a half pounds; and five or six pounds is not uncommon. The blood of the diminutive Italian Greyhound has been freely used in reducing the size of these dogs, and hence the most of them require the heat of a fire in winter, as well as the protection of a blanket when out of doors, and covering at night. It is not to be denied that they are the most beautiful of pets, very intelligent, but timid to a degree.

We have one of medium size which can clearly make himself understood with his dog talk. Full of amiable tricks and play, he is so suspicious of strangers that he will not permit them to come near him, much less touch him. He is not deficient in courage, boldly attacking strange dogs of larger size visiting the house, and even fastening promptly upon

them if they seek to usurp his place in the affections of his mistress; and yet so delicate that it was with difficulty that he could be taught to kill mice that had first been caught in a trap. When ordered to go to bed at night, he will go to his box and earnestly work to cover himself up, scolding to himself all the while at his want of success. Upon being properly covered, he will continue his half-growling, half-whining thanks until he thinks himself properly tucked in. Every visitor is exuberantly welcomed with a joyous and continued bark, and bid adieu in the same demonstrative manner. But should a step be heard outside, that sounds suspicious, the note is changed into one of warning, and strangers are carefully examined, to see if it will be perfectly safe to make their acquaintance. Jockey is quite a character in our suburban town, with his mincing, careful ways. His mistress truly says he knows least of what a dog should know, and more of what a dog is supposed not to know, than any she has ever owned. He is regularly fed at meal times, and, if allowed in the dining room, will walk about the table to every person present, on the extreme tips of his hind toes, coaxing each one in succession until he receives a nice bit.

III. The Scotch Terrier.

Scotch Terriers are of many varieties. The Wire-haired Terrier, is an English dog, and as active at play as he is indefatigable after vermin. Scotch Terriers, whatever the strain, whether it be the celebrated Dandy Dinmont, the Rough, the Smooth-haired, or the Skye, are all alike in their warfare on rats and other vermin. In intelligence, warmth of attachment to their masters, and in vivacity, they are the peer of any dog, whatever his breed.

There is a modified Skye Terrier, sometimes called Long-haired Scotch, which is fully as good after vermin as the Wire-haired, or the Dandy Dinmonts.

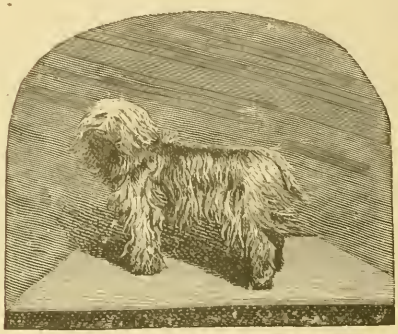
IV. The Yorkshire Terrier.

The Yorkshire Terrier, often called Broken-haired Scotch, is an exceedingly fine dog, with a compact body, fully covered with long hair, quite free from curling or crimping. The head is rather large; jaw and nose sharp. There are three different shades of color on the best dogs: blue, silvery and tan; the tan on the fluff of the head, ears and legs being of the richest possible color.

There is another blue-tan Yorkshire, or silk-coated Terrier. The coat which is exceedingly long, silky and smooth, was probably got from a Maltese cross, and the rich blue-tan color is the result of careful selection. They are a modern breed, and the best ones are quite rare.

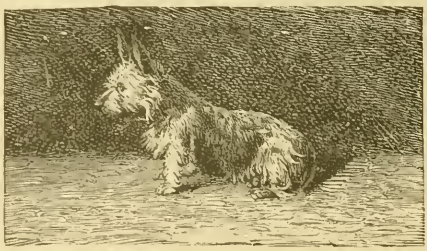
V. The Skye-terrier.

This is one of the most fashionable of Toy-terriers, and, when well bred, is as unique as it is beautiful. The really fine dogs of this breed, are among the rarest of the dog kind. The cut of the Yorkshire Terrier,



YORKSHIRE TERRIER.

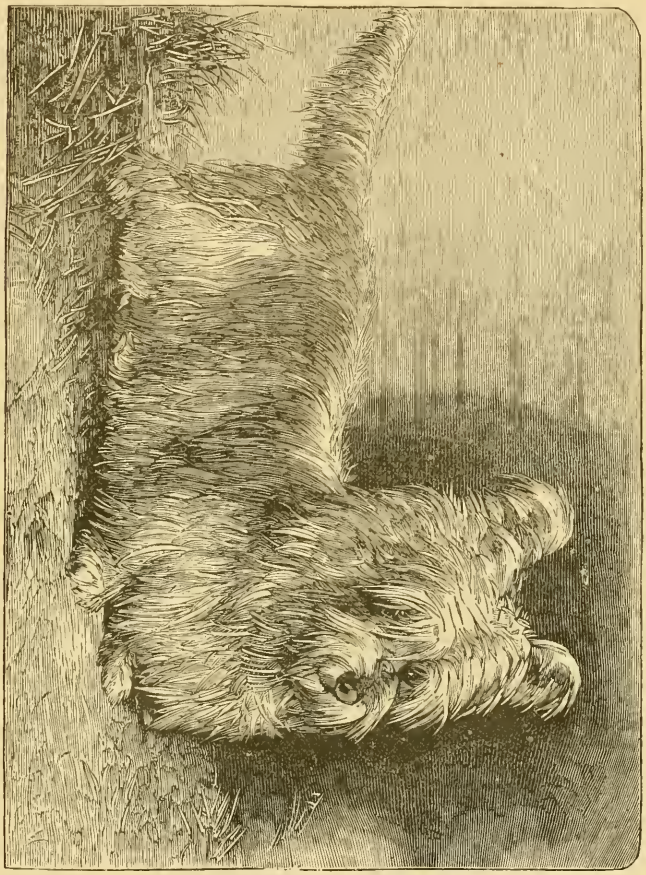
not a good one, would be generally accepted in the United States as representing the breed. In fact, any Scotch Terrier with long hair, is passed off for the true breed.



SHORT-HAIRED SKYE-TERRIER.

The short-haired variety, shown in the cut, is really one of the most valuable of any Terrier extant, being sagacious, hardy, energetic and with the courage of a Bloodhound; and taking to the coldest water fearlessly in pursuit of game. His color is mostly dark brown.

The long-haired or pet Skye is altogether a different dog. We give his full description, condensed from that of Rev. Cumming Macdona, a crit-



SKYE TERRIER.—PRICK-EARED.

ical judge. He says the coat of the Skye is so fully developed that it is often compared to a mat. The true Skye should have its ears, legs and tail all merging in one mass, with the exception of the tip of the latter

and of the feet. In a well-coated specimen the eyes are only to be guessed at, and even the nose is often obscured; but generally they are each more or less visible on a close inspection.

The eyes are keen, expressive, small, and generally of dark color, either black or brown, as are the nose and palate.

The ears are of good size, that is, about three inches long, clothed thickly with hair, which should mingle with that of the face and neck, and decidedly falling, but not quite close to the cheek, owing to the quantity of hair by which they are surrounded.

The shape of the head is not easily got at, but it is somewhat wide, while the neck is unusually long. The body, also, is too much coated to show its shape, and the form of the shoulders and back ribs can only be ascertained by handling, or by dipping the dog in water, when the shape at once becomes apparent. The fore legs are sometimes more or less bandy, but the less the better; there are no dew claws, and the feet are not very strong, having a tendency to flatness and thinness of the soles. Tail long, and carried horizontally, but with a sweep, so that the tip is a little below the level of the back. Weight, from ten to eighteen pounds, the bitches being nearly as heavy as the dogs—perhaps about two pounds less. The colors most fancied are silver gray with black tips, fawn with dark brown tip to the ears and tail, dark slaty blue (slightly grizzled, but without any absolute admixture of white), black and pure fawn—the order we have named being in accordance with the value of each. The hair should be long, straight, and shining, like that of the tail of the horse; any appearance of silkiness, woolliness, or curl to be avoided, excepting on the top of the head, where it has a slight tendency to silkiness. By some fanciers the prick ear is preferred to the drop, the strains in which this point is shown being stronger in the body, and hardier in constitution and courage. The prick ear should stand up well, and terminate in a fine tuft of hair coming to a decided point.

VI. The Maltese Dog.

This elegant Toy-terrier is, when of full age (five years old), a complete mass of long silky hair, straight and so thick that the outline of the body cannot be distinguished. The hair on the ears gives it a peculiar appearance. The color is pure white, without stain, and if there is any tendency to curl the breed is impure.

VII. The Italian Greyhound.

This is one of the most elegant of house pets, as delicate as he is cleanly and agile, a perfect counterpart in miniature of the best specimens of the smooth Coursing Greyhound. Unfortunately, they are so delicate

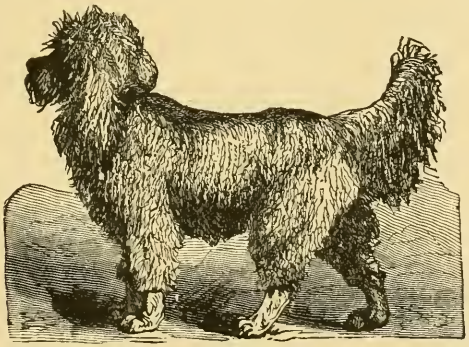
and susceptible to cold, that they must not only be well housed, but warmly clothed. They are not really deficient in courage, and in warm weather they chase rabbits and other small game.

To win prizes, these dogs must strictly conform to the following characteristics: Head long and firm; ears thin and pendulous; neck long; shoulders well set back; chest deep; straight fore-legs beautifully formed, not full of muscle, but wiry and thin to appearance, but withal strong, with a nice arched foot; back slightly arched just at commencement of where the loin is set on, deeply ribbed, but cut away at the loin, that is to say, come off with a beautiful sweep from the chest; ribs up to the flank; nice square hips, with fine stern, well-bent hocks, and strong stifles, all being slim and beautiful, but plenty of strength, although modelled so fine; self-colored—the colors most approved being fawn, blue, or black.

ITALIAN GREYHOUND.

VIII. The Poodle.

The Poodle is one of the most interesting of pet dogs, both from the peculiarity of its curly white coat, and its docility and adaptation to acquire numberless interesting tricks; in fact, wherever learned dogs are exhibited, the Poodle is sure to be the one depended upon for intri-



POODLE.

cate tricks. Its education is carried by showmen to an extent wonderful to those who do not know that the dog is always coached by signs; nevertheless this could not be accomplished if, in intelligence and memory, the Poodle was not superior to other dogs.

It used to be the fashion to clip the hair close from the body, except the mane of the neck, a tuft on each foot, and on the end of the tail, with the idea that poor Poodle would thus be transformed into a miniature lion.

IX. The King Charles Spaniel.

Among Toy Spaniels two breeds are recognized—the Blenheim and the King Charles Spaniel, the latter being rather the larger and handsomer of the two. As house dogs, both are watchful, because timid, but not readily silenced, since they can easily run under a sofa or other place inconvenient to be got at, where they continue their yelping to the discomfiture of would-be depredators.

They are both tender eyed dogs, that is, they suffer from watering at the eyes, and the shorter the nose the greater is this disability.

The points of the King Charles. are: Head round and short; ears long and pendent, well coated, or what is termed "feathered;" eyes large and prominent; nose short with a deep stop—that is, well indented just at the setting in of the nose from the forehead; jaw undershot; neck short, well coated; shoulders wide; fore-legs short and well feathered; feet long, with good coat between each toe; back compact and short; loin strong; tail carried low, never higher than the level of the back, with plenty of feathers on it; hind legs well feathered also; coat abundant, silky, straight, and glossy; the black pure and very fine; where tanned, rich mahogany color, free from white, a tan spot over each eye, lips tan, and all under parts, with legs and feet, deep rich tan.

The points of the Blenheim vary but little from this except in color. It is smaller, and the color is always a white ground with red or yellow spots, with a well defined blaze of white between the eyes. The ears, also, are colored, and the whole of the head except the nose and the white mark up the forehead.

X. The Shock Dog.

This is a cross between the Danish Spaniel and the Poodle, a long curly-haired, large-eyed, short-nosed little fellow, good as a vermin hunter or as a pet.

XI. The Lion Dog.

This, again, is a cross-bred dog between the Poodle and a small Spaniel, and is strictly a toy dog. He is now scarcely known, since fashion has decided in favor of other varieties as pets.

XII. The Barbet.

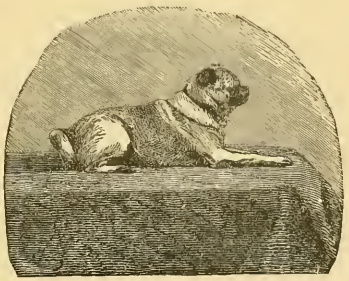
The Barbet is simply a diminutive Poodle, and of no possible value, since it lacks the intelligence of the Poodle and is not small enough to render it valuable as a toy.

XIII. The Pug Dog.

Curiously the Pug, a diminutive Bull-dog with a bushy tail, which was once the fashion in England, is again in favor as a pet. This curious little fellow, said to be of Chinese origin, has always been common in Holland, where they are much liked. They are, however, seldom bred true

LION DOG.

there, and hence low foreheads, pointed nose, and yellow "masks" are apt to crop out in animals obtained in Holland. In France these dogs are termed Raquet. The Pug is cleanly, sensible rather than intelligent, and most affectionate in disposition; to our thinking, there is no more unique toy dog than the snub-nosed little Pug.



THE PUG DOG.

The true characteristics, according to an English authority, are as follows: The true Pug should be small, of a fawn color, with black muzzle and curled tail, compact in form, and beautiful in its ugliness. For a show dog, the Pug should have a round head; skull high; ears small,

fine in quality, and dark, carried close to the head; eyes very prominent, almost as if they would leave the sockets, dark and lustrous; nostrils and nose well set back, with an indent or stop, but not so much as the Bull-dog; jaws level, with a dark muzzle and a black mole on each cheek, with three hairs in each mole; shoulders broad; chest wide; back strong, well loined; tail curled over on one side about half a turn more than one curl; legs straight; feet flat; color fawn, with all points black, but devoid of smut in body-color; coat of fine quality, with a trace of dark down the centre of back.

CHAPTER VI.

MANAGEMENT AND TRAINING OF DOGS.

I. THE FEEDING OF DOGS.——II. EXERCISE.——III. THE HOUSING OF DOGS.——IV. CLEANING.——V. FOUR RULES OF HEALTH.——VI. TRAINING.——VII. TRAINING TO CARRY.——VIII. RETRIEVING.——IX. TRAINING TO DROP TO HAND.——X. TRAINING TO THE GUN.——XI. OBEDIENCE IMPERATIVE.

I. The Feeding of Dogs.

Dogs, to be useful, must be well and regularly fed. It is a mistaken idea that stinting the food makes them active; so also is that other absurd idea that a puppy must be kept on low diet to make him healthy and vigorous. The puppy, when weaned, should have a diet of milk, with the addition of a little sugar, three times a day; and in addition he should have, once a day, a mess of milk thickened with good wheat flour, until he is three months old. Occasionally he may have broth thickened with oat-meal or corn-meal, or some small bits of well-cooked meat. This should carry him to the age of three or four months, after which he should be fed three times a day, with oat-meal or corn-meal pudding, made by stirring the meal in soup of rough meat, allowing him the bones to amuse himself with. After he is six months old, he need be fed but twice a day, upon the same diet, or, if only one is kept, scraps from the table, such as bread, biscuits, corn bread, and the scraps of meat will keep him in good heart. Clear, fresh water is always indispensable, and this should be within reach at all times. After a dog is a year old, one full meal given at night, if he be a hunting dog, or in the morning, if he be a house dog, will do.

II. Exercise.

This is most important; the young dog cannot do without it, and if the older dog does not get it, he soon becomes worthless. The plan of keeping dogs chained constantly is brutal in the extreme; it makes them sullen, savage, and ferocious, and often indiscriminate in their attacks. The dog is an intelligent animal, and should be treated as such, else he is no better than a wild brute. No puppy ever became a fine dog if kept chained; and young dogs kept chained to make them savage, soon become as stupid as their masters.

III. The Housing of Dogs.

Every dog should have some place of his own in which to lie. It need not be expensive, but it should be comfortable, and should be kept clean. Every dog should have a good, well ventilated kennel and be taught that this is his home. Even the pet dog, should have his own particular bed place, and be taught to lie there when at rest.

IV. Cleaning.

The house dog and all pet dogs should be regularly cleaned, as much so as the horse. They should be brushed every day, and all long-haired dogs should be washed once a week. If they are lame, seek the cause. Examine the feet, first of all, for thorns. In bad weather, the membranes of the toes often get sore; if so, wash them with soap and water, and apply veterinary cosmaline. If strict cleanliness were the rule, we should hear less of the vexation of fleas.

V. Four Rules of Health.

Feed regularly; have plenty of clear, cool water always within reach, for the dog to drink; keep him perfectly clean; and give him plenty of exercise. Thus you may be assured that you have done your whole duty to the most sagacious, affectionate, and trusty of animals, companions to man.

VI. Training.

Without training, a dog is like an uneducated man, comparatively of little value. His instinct will of course serve him to good purpose, but the educated, as compared with the uneducated dog is pithily described in the words of the poet Fields:

> "Alike, yet different. The one a beast,
> The other a sentient creature."

It is an English maxim, and a good one, that "you cannot begin too early to teach any kind of dog, obedience." It is the most important part of any education and, once thoroughly learned, the rest is easy. In England it is absolutely necessary that dogs should be obedient, and the same is measurably true of our more sparsely settled country. In the training of farm dogs, it is not difficult to teach this habit of obedience. It does not take severe beating, for a "cowed" dog is of but little account. In relation to training for field work, an English authority lays down certain rules, which are sensible, and from which we make extracts.

VII. Training to Carry.

Take a stake fastened to a piece of cord, the other end of which is tied to the collar; lead the dog to a piece of grass, and press the stake into the ground. First teach him to hold a small but sound piece of wood, by waving it over his head, and then allowing him to take it in his mouth; then throw it from you a little way, saying, "Go fetch." Take the stick gently from his mouth and say, "Good boy." After you have exercised him for some time in this, so that he will pick the stick from the ground, throw it farther away, and if he bring it to you, reward him with biscuits, etc.; but let him have no food but that which he gains by his lessons. If at any time he offers to run away or tear the stick, not bringing it properly, then call him. If he does not come, order him, and if that be not sufficient give him a few raps; but if he will come to you and bring the stick, although other people call him to them, reward him. Afterwards teach him to carry dead or live birds, etc., by means of a tame pigeon or a dead rabbit, without hurting them.

VIII. Retrieving.

When you are out for a walk with him, drop a glove unknown to him, and, after going a little way, say, "I've lost." If he does not understand, wave the hand in the direction of the place, until by seeking about he finds the glove. Gradually increase the distance to half a mile or more; but if he bring the wrong thing, take it from him and reward him, but wave him back again till he bring the right thing, but if he does not bring anything, chastise him.

IX. Training to Drop to Hand.

Press on his hind-quarters and make him sit down, saying to him, "Drop." Then, holding up the hand, retire with your face towards him, saying, "Drop, drop." If he does not move forward reward him; but if he moves lead him back and drop him again. If he does it well, take him out with a gun, and, dropping him behind you, throw up a glove, fire off a cap alone, and say, "Go seek," and make him bring the glove; and if the dog be not afraid, gradually increase the charge until he likes it; then turn over a few rabbits, and do not let him move until you have shot them, then send him for them. The rest can only be learned by exercising in this way constantly. They are very useful in catching ducks and water-fowl which are moulted and cannot fly. In conclusion, let me advise beginners to use whips as little as possible, and let no one touch the dog but yourself.

X. Training Dogs to the Gun.

In order to more readily teach our pupil to back another dog's point, when he is taken into the field and hunted on game, he should know that

"Toho" is the command, stop or halt, which we teach him after he has become prompt in charging, using the check cord as in the first lessons. Provide yourself with some morsels of food when the dog is hungry, and having fastened the cord to his collar, as before, take him into an apartment or yard, where no one can attract his attention, and throw a piece of the food where he can see it fall. He will naturally run for it. Let him do so, but when he comes near to it pull the cord sharply and cry out "Toho" in a loud tone. He will probably drop or charge, remembering the lesson you first taught him. This is what we desire so long as he stops. Continue this until the use of the cord is not required, and he will halt to the verbal command, and at the same time keep him perfectly familiar with the down charge by signal, and to dropping to shot if you have determined to teach it, and have begun it.

In order to encourage our young dog to quick movement, and to cultivate in him a free and speedy gait, we should take him with us in our rambles to the suburbs of the city, where there are open fields and plenty of room. For a time keep the cord attached to his collar, and let it trail after him as he moves about; it will not impede him as much as might be expected, especially if you select a strong one, about as thick as an ordinary lead pencil, and "point" the end with thread to keep it from fraying. You will find that it will greatly add to the control you have to exercise over him, and will have the effect of impressing him while he is at liberty, that you are still master. On these walks, accustom your dog to the sound of the whistle you intend using for him, summoning him from time to time that he may become perfectly familiar with it. Practise him, while you are out in the same lessons that you began at home, until every lesson is obeyed promptly; and when he charges, walk away with him, each time extending the distance, insisting upon his remaining so until ordered to hold up.

No doubt he will notice, and perhaps show an eagerness to hunt, sparrows and other small birds you may come across in your walks, and probably point when he scents them, from natural instinct. This we do not check, but rather encourage for a short time, as it will give a greater desire for the chase, and when ready to be put on game, and once shown to him, he will soon choose between the two, and readily distinguish the difference.

Your walks should be more frequent the nearer you approach the shooting season, when you shall want to go into the field, and confirm and put to use the lessons you have imparted to your dog.

XI. Obedience Imperative.

In conclusion, the authority quoted, insists, as we have already stated, that to train any dog, it is imperative that you should begin early, and

insist on the creature's absolute obedience to your commands, whether conveyed by voice or action. There is no need for great severity, much less cruelty; but the dog *must* be made to know and feel that the man is master. When that part of its education is complete, the rest is a mere matter of patience and detail.

CHAPTER VII.

DISEASES OF DOGS.

I. INTRODUCTION.——II. DISTEMPER.——III. FITS AND BRAIN DISEASES.——IV. DIARRHŒA AND DYSENTERY.——V. CONSTIPATION.——VI. INFLAMMATION OF THE BOWELS.——VII. THROAT AND LUNG DISEASES.——VIII. GOITRE.——IX. RABIES OR HYDROPHOBIA.

I. Introduction.

Dogs are generally very healthy, but when they become ill they are usually very ill. Though hardy and rugged when in health, sickness makes them very tender and sensitive; but their pathology is well marked, and their system responds readily to judicious treatment. A few pages devoted to their treatment and nursing when sick will doubtless prove interesting and valuable to many of our readers, though the dimensions of this work will not admit of a very extended description of their various diseases.

II. Distemper.

This is the bane of the canine. To him it is what children's diseases are to the human family. All, or nearly all, must have it, and it is very often fatal, especially among the finer breeds, in which the dogs are more tender from extended in-and-in breeding. It is a specific blood poison, contagious from one dog to another, and attended by high fever, as oftentimes by many complications. It may arise spontaneously within the body, the cause being obscure.

How to know it.—There is langnor, loss of appetite, and redness of the eyes; the nose is hot and dry; the urine is high colored; bowels sometimes loose, and sometimes the reverse, with very offensive fæces; there is disinclination to move; the pulse is rapid, and breathing accelerated. These symptoms continue about two days, when the eyes and nose begin to run, at first watery, and later purulent; a cough sets in, and usually pneumonia developes, with furred tongue and high fever,—often with delirium and great weakness; the eyes and nose become so gummed up as to cause blindness and a change in the breathing, which is now not done through the nose, as in health, but through the mouth, and is rapid and painful. If the seat of the complication is in the bowels, there will be violent diarrhœa with black, offensive (sometimes bloody) fæces, streaked with coagulated mucus. If the skin is affected, there will be pustules

on the inside of the thighs, arms and along the belly; these fill and burst, discharging a little dark, watery matter. If the brain is much affected, there is great heat in the head, with a desire to raise up hard against your hand, when stroking the head, and fits usually follow.

Fits are generally fatal, and pneumonia is often so. The violent diarrhœa will nearly always carry them off.

What to do.—Put the patient in a dry, clean, well ventilated comfortable place, with a temperature of about 60° or 62°; allow him plenty of clean fresh water to drink. In the early stage of distemper, before complications have arisen, give tincture of aconite root, in one drop doses in a teaspoonful of water, every half hour, and three grains of quinine, morning, noon and night.

If the lungs are affected, apply a mustard paste to the sides, well rubbed in, putting on a blanket to confine the fumes; and if after an hour he is still very bad, wash the mustard off with warm water and make a fresh application, and give the following:

No. 1.
30 Drops tincture aconite root,
½ Ounce sweet spirits of nitre,
½ Ounce tincture of gentian,
2 Ounces syrup of tolu,
Water to make 4 ounces,
Mix.

Give a teaspoonful every two hours. Feed on beef tea, raw eggs, bread and milk, etc.

If the bowels are affected, give a tablespoonful of syrup of buckthorn, and supplement it with the following:

No. 2.
2 Drachms prepared chalk,
1 Drachm aromatic confection,
½ Ounce tincture of opium,
2 Drachms gum arabic,
Water to make 8 ounces,
Mix.

Give one or two tablespoonfuls, according to the size of the dog, three or four times a day, or, if very bad, after every loose evacuation.

Or, instead, the following may be used:

No. 3
1 Ounce laudanum,
1 Ounce spirits camphor,
1 Ounce extract ginger,
1 Ounce brandy,
1 Ounce tincture catechu,
Mix.

Give a teaspoonful, in a little sweetened water, after each loose stool. If there is straining, give the following injection:

No. 4.
1 Ounce sulphuric ether,
1 Ounce laudanum,
2 Ounces water,
Mix.

Inject a teaspoonful into the rectum occasionally. If these do not prove efficient, give a tablespoonful of castor oil and repeat No. 2, or give the following:

No. 5.
½ Grain nitrate of silver,
Bread crumb,
Make a pill.

Give this night and morning. Feed on mutton broth thickened with arrow-root, rice-water and a little port wine.

If the brain is affected, it will be shown by delirium and fits, with a desire for pressure on the head. Insert a seton across the back of the neck and close to the poll, just beneath the skin, and smear turpentine on the tape, to increase the suppurative action. Apply ice poultices to the head. Give No. 1, and, in addition, the following mixture:

No. 6.
6 Ounces elixir bromide of potassium,
3 Drachms tincture of gelseminum,
Mix.

Give a teaspoonful every two hours, till the brain symptoms are abated; then drop off to three times a day, continuing for two more days.

When the fever is abated and the stage of exhaustion comes on, give the following:

No. 7.
2 Ounces elixir calisaya, iron and bismuth,
2 Ounces syrup of tolu,
3 Drachms chlorate potash,
Water to make 6 ounces,
Mix.

Give a tablespoonful every three or four hours, and feed on beef tea thickened with arrow-root. Feed this four or five times a day, a little at a time. Continue the quinine in two grain doses, morning and night. Or, instead of the quinine, the following may be given:

No. 8.
2 Ounces compound tincture of bark,
14 Ounces decoction of yellow bark,
Mix.

Give three tablespoonfuls three times a day to a large dog. Mr. Arnold Burges, of Hillsdale, Mich., says this treatment will sometimes revive dogs that to all appearances are dead; so never give them up till you are *sure* life is extinct.

The diet of distemper patients should be diligently attended to. They require very little the first two or three days,—that is, while the fever is

high, and they should get no solid food whatever, but simply broths and gruel. When the fever is gone, and there is great exhaustion, give strong beef tea every four hours, pouring it down the throat, if they will not lap it. It may be thickened with arrow-root; and port wine, thickened with the same, may also be given every four hours, alternating them; they can take from one half to a whole teacupful at a time. A raw egg broken into the mouth three or four times a day is excellent, if the bowels are not too loose.

Cleanliness should be strictly observed, fresh litter given every day, and the excrement removed immediately when voided. See that there is good ventilation, but avoid drafts, and keep the temperature at 60° or 62°. The fine, short-haired breeds of dogs, as greyhounds, terriers, etc., should be covered. Allow no exercise nor exposure until recovery is complete.

III. Fits and Brain Diseases.

Fits are a common ailment of dogs, owing to the high developement of the nervous system. A fit should not be mistaken for rabies, and a good dog destroyed in consequence; for they come upon many and sometimes slight provocations, such as worms, indigestion, over-eating, etc.

How to know them.—There is champing of the jaws, frothing at the mouth, and delirium; the dog falls, works his legs violently, and after a minute or so gets quiet; very soon he gets up, shakes himself, looks around rather wildly, as though bewildered for the moment, and in five minutes is as well as ever till another fit comes on. Each fit weakens him more and more, so that he may die eventually from exhaustion. But there is not the slightest danger to his master or attendant.

Brain diseases are rare, except as complications in distemper, or as a result of injuries and external violence.

What to do.—Nothing can be done during the fit. For a case so bad that the fit would cost the dog his life no treatment would be of any avail. The fit being over, give him a dose of castor oil,—from one to three tablespoonfuls, according to size of the dog,—and also the injection No. 4. After half an hour begin on the following:

No. 9. 2 Drachms bromide of potash,
6 Ounces water,
Mix.

Give a tablespoonful every two hours till the oil operates; if there are more fits, continue thus for twelve hours, or even longer, but if the fits do not return, three times a day, for two days, will be enough. If fever and brain symptoms follow the fit, give No. 6. Let him fast for a day or two. If worms are suspected, treat for them vigorously. To quiet all apprehension on the part of the household, let the dog be chained up in a quiet place till the case is decided.

IV. Diarrhœa and Dysentery.

Diarrhœa should be checked, or it will run into dysentery. It is usually caused by some irritant in the bowels. Give a tablespoonful of castor oil, and after half an hour begin on No. 3; change the diet to mutton soup and rice, bread and boiled milk, etc. If this does not check it, give No. 2.

Its running on into dysentery will be known by the blood that is mixed with the excretions, the great straining, and the redness of the rectum, as also by the pain and anguish depicted on the countenance. Give a dose of castor oil,—from one to two tablespoonfuls,—and also Nos. 2 and 3, with frequent injections of No. 4. If this treatment does not prove effective in a few hours, repeat the castor oil; but mix with it a tablespoonful of olive oil, and give No. 5. Keep him perfectly quiet, and feed on rice-water thickened with arrow-root; when better, give boiled milk thickened with cracker.

V. Constipation.

Dogs are frequently troubled with obstinate constipation, caused by a too heavy meat diet with too little exercise. The fæces sometimes accumulate in the bowels and become hardened like a stone, so that nothing short of an instrumental removal will do the least good.

What to do.—Give a large dog half an ounce of castor oil, repeating this in ten hours, if the bowels have not moved. Give injections of soap and water frequently. If these means do not succeed, try and find where the obstruction is, by inserting the finger in the rectum and by feeling the belly, and if it can be reached from behind break it up with uterine forceps. If it cannot be reached, give the following:

No. 10. 1 Drachm jalap,
1 Drachm ginger,
1 Drachm gentian,
Syrup, to make a pill.

Give as one dose, and continue the injections.

Prevention.—Feed on a mixed diet, table scraps, bits of softened bread, milk, mush, vegetables and soup, and give plenty of exercise.

VI. Inflammation of the Bowels.

This occurs occasionally from eating acrid, caustic substances in the food; also, from poisons, or from lying too long on cold, icy ground. There will be whining, uneasiness, frequent getting up and down, pain upon pressure on the belly, high fever, rapid pulse, hurried breathing, and constipation.

What to do.—Give half an ounce of castor oil, with a tablespoonful of olive oil in it. Half an hour later, give the following:

No. 11. ½ Drachm tincture aconite root,
4 Ounces water,
Mix.

Give a tablespoonful every half hour. Give from ⅛ to ½ grain of morphia every three or four hours to allay the pain, and apply a linseed-meal poultice, wet with hot water and having a tablespoonful of mustard in it, to the bowels. Warm water injections will also be very serviceable.

VII. Throat and Lung Diseases, and Goitre.

Dogs often catch cold, cough, run at the nose, sneeze and have considerable fever, which condition, if neglected, may run into pneumonia. If taken at the very start, give No. 11, and two or three grains of quinine three times a day; but if it has run on to a cough and discharge from the nose, rub mustard paste well into the throat, and give the following:

No. 12 ½ Drachm tincture of aconite root,
1 Drachm syrup of squills,
2 Drachms syrup of ipecac,
3 Drachms spirits of nitre,
Water to make 4 ounces,
Mix.

Give a teaspoonful three times a day.

If the lungs become affected, and there is a short, distressing cough, and rapid, painful breathing accompanied with a slight grunt at each expiration, apply mustard paste to the sides, rubbing it in well to the hair and covering it to retain the fumes. After an hour, sponge it off with tepid water and repeat the application. Give No. 1 till the fever is broken, then change to No. 7. Continue the quinine right through. Feed lightly. Temperature, ventilation, etc., must be as given for distemper.

VIII. Goitre.

Goitre is an enlargement of the thyroid gland, situated on the side of the neck two or three inches from the throat. It has been known to attain the size of a man's fist, and frequently interferes with the breathing by pressing on the windpipe. It may come on one or both sides. Rub it once a day with the following ointment:

No. 13. 2 Drachms iodide of potash,
2 Ounces lard,
Mix.

Or, instead, paint once a day with tincture of iodine. With either treatment it will usually disappear in the course of four to six weeks.

IX. Rabies or Hydrophobia.

Rabies or canine madness (misnamed hydrophobia) is the effect of a specific blood poison introduced into the system by inoculation. It is

thought, in some cases, to arise spontaneously in dogs, cats, wolves and foxes, and in all cases is communicable both to man and animals by biting them. The virus appears to lie in the saliva and bronchial mucus, and it may be communicated by introducing dry saliva into a wound, without any bite. The period of incubation is from three days to a year, and it has been thought to develope after still longer periods. The usual period is from two to four weeks, rarely exceeding forty days.

How to know it.—It comes on gradually. The first thing noticed is a nervous uneasiness, and a melancholy look in the eyes, with a sort of pleading expression; an unusual fondness for the master, manifested by laying the head on his knee, licking his hand, and looking wistfully into his face; and a quiet, subdued manner in these and other actions, with marked loss of the usual playfulness. This changes to a wild, apprehensive expression of countenance, and an inclination to hide and shrink out of sight; he may be called out, but will seem to be frightened and run back; if poked with a stick, he will snap at it; he appears to be terribly thirsty, and will make frequent and desperate attempts to drink, but cannot swallow; when fed, he may perhaps take the meat into his mouth, but is unable either to chew or bolt it. The symptoms may develope fully in two more days, when he will become delirious and start on a tramp. If shut up in a room he will walk round and round, looking up occasionally as though wishing to get out; if out of doors he will walk off, snapping, biting and gnawing whatever comes in his way, frequently lacerating his mouth, so that the froth which hangs from his lips is streaked with blood. From the start to the finish, he will sometimes howl most dismally. There seems to be paralysis of the throat, causing the inability to swallow before mentioned; the tongue gets black; the lower jaw often drops, and the tongue protrudes; and although in his paroxysms he will close the jaws enough to bite, yet when the jaw is dropped he cannot howl. This is distinctively called dumb madness. The symptoms all become aggravated till death terminates the case.

Every bite is not necessarily fatal. After many bites rabies does not ensue at all, but whenever it does, death always follows. No person who has been bitten should worry about it, for this very anxiety always predisposes to the development of the disease.

What to do.—Whenever bitten by a dog or any other animal, whether rabid or not, cauterize thoroughly with nitrate of silver or a red hot iron. If the dog is rabid, the part should be cut out and then cauterized.

When a dog acts suspiciously, chain him up, and be very careful in handling him, till the nature of the ailment is determined. If it proves to be rabies, he must of course be killed.

CHAPTER VIII.

DISEASES OF DOGS—CONTINUED.

I. PARASITIC DISEASES OF THE DOG——II. MANGE.——III. FLEAS.——IV. LICE.——V. RINGWORM——VI. INTESTINAL WORMS——VII. WORMS IN THE KIDNEYS AND HEART——VIII. SURFEIT.——IX. ABSCESSES AND PHLEGMONOUS TUMORS.——X.——FRACTURES AND WOUNDS.——XI. DISEASES OF THE GENITIVE ORGANS, OBSTETRICS, ETC.——XII. CHOREA.——XIII. TETANUS.——XIV. PARALYSIS.——XV. POISONS AND THEIR ANTIDOTES.

I. Parasitic Diseases of the Dog.

The dog is very subject to parasitic diseases,—more so than any other of the domestic animals. The external animal parasites can most conveniently be considered under the heads of Mange, Lice and Fleas. Ringworm is also an external parasitic disease, but is the product of a vegetable (instead of animal) organism. Internal parasites include not only intestinal worms, but also worms in the kidneys and (occasionally) in the heart. Dogs are, of all animals, the most prolific source of tapeworm.

II. Mange.

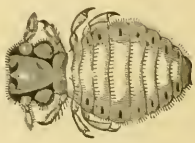
Mange is caused by an *acarus*, a mite-like organism, that burrows in the skin. The *sarcoptes* burrow in the deeper layers of the skin and in the hair follicles, giving rise to what is distinctively called follicular mange, and which forms the inveterate mange that sometimes baffles the most persistent treatment. The *dermatophagus* and *dermatocoptes* occasion the milder forms of mange, and, ravaging on the surface and among the scabs, are more easily found and killed.

How to know it.—Intense itching, inciting the most persistent and sometimes apparently frantic scratching, is an invariable symptom; the dog will sit down and scratch till bare patches are worn off the points of one or both haunches, so as, in some cases, even to cause tumors to arise there. This itching usually makes its appearance first on the elbows, fore legs, around the eyes, on the belly, in the flanks, and down the inside of the thighs; but very soon it spreads to all parts of the body, being characterized by a reddish pimply eruption, with scaly patches between the pimples, and by loss of hair. There is also an offensive, disagreeable odor, which, in connection with the scratching and loss of hair, excites irrepressible disgust, that finds expression in the familiar allusions to a "mangy dog." As with the itch in human kind, it is no

disgrace to get it, but it is a great disgrace to keep it,—a disgrace to the dog's master at least.

Mange is principally spread by contagion; nevertheless, poverty, hunger and dirt unquestionably predispose to it.

THE BLOOD-SUCKER.



THE BIRD LOUSE.

What to do.—Wash the animal thoroughly with soap and water, to remove all scabs and scurf; when dry, rub well in to all affected parts the following ointment:

No. 14. 2 Ounces sulphur,
2 Ounces lard,
Mix.

Apply once a day, but the washing need not be repeated unless more than four applications are required. In a case requiring prolonged treatment, repeat the washing every fourth day.

Or, if preferred, the following may be used:

No. 15. 1 Ounce oil of tar,
20 Ounces whale oil,
Mix.

Apply once a day. Give fresh litter every day, and scald all rugs and blankets that have been used. Wash the kennel with boiling water and soap, and, when dry, sponge it over with the following lotion:

No. 16. 1 Ounce corrosive sublimate,
1 Gallon water,
Mix.

Specially obstinate cases will be apt to require specially faithful and persevering treatment. Internal remedies are of no account. No change need be made in the feeding, unless the dog is thin, in which case increase his allowance.

Red Mange.—This is simply an irritation of the skin, which makes white hair assume a red color, and gives rise to some scratching. For this it will be sufficient to apply the following, once a day:

No. 17. 1 Ounce oil of juniper,
7 Ounces glycerine,
Mix.

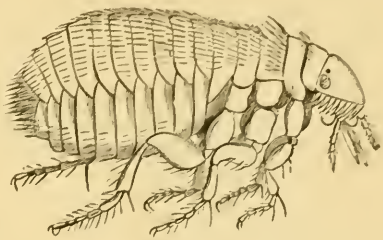
III. Fleas.

These worry all dogs more or less, but they do not produce the same degree of irritation as mange, and are much more easily managed. They are best got rid of by Persian insect powder dusted down into the roots of the hair, and over carpets, etc., or by using the following ointment:

No. 18. 1 Ounce oil of anise,
10 Ounces olive oil,
Mix.

Rub well in, washing it off six hours afterwards. Give fresh pine shavings to lie on.

Cats are also troubled with fleas. The formidable specimen shown in the cut is, of course, greatly magnified.



THE CAT FLEA.

IV. Lice.

Lice that live on the dog are of two kinds, viz: the blood-sucker (*hæmatopinus*) with narrow head and long, trunk-like sucking tube, and the bird louse (*trichodectes*) with large, broad head and biting jaws, but no sucking tube. They may be killed by sifting wood ashes into the hair, or by oiling the dog with whale-oil, washing it off a few hours afterwards, or by washing him with a weak solution of tobacco juice.

V. Ringworm.

The presence of the fungus-like vegetable parasite that causes ringworm will be easily recognized by the considerable local irritation, but more especially by an elevation of the skin in the form of a ring, which spreads by the ring increasing in size, the skin also becoming scaly and rough, and soon the hair drops off. The dog keeps up a good deal of scratching, but only of the affected spots. Apply No. 15, after washing with soap and water, and rub it in well.

VI. Intestinal Worms.

The Tapeworm.—This is a flat-bodied worm made up of segments (or joints) from one-eighth to one-half of an inch long, joined end to end, and with a well defined division between them In length, it varies from one inch to one hundred feet. Its head, which is on the narrow end, is furnished with circular sucking discs, surrounded by one or more rows of hooklets. As fast as the segments become mature, they are detached from the tail end and, passing out with the excrement, crawl around on the

ground or grass, etc., meanwhile depositing the eggs. These are excessively numerous, estimated to be about 25,000,000 to each entire tapeworm. Being eaten with the food by the unwary victim, the eggs hatch, setting free an ovoid, six-hooked embryo, which bores its way through the tissues till it reaches a location that suits its fancy (or nature), and there encysts itself. Here it remains quite inert, until eaten with the flesh in which it is embedded, when a perfect tapeworm developes in the intestines of the animal thus eating.

Tænia Echinococcus is a tapeworm of the dog, not exceeding one inch in length, which, in its cystic form, may exist in any of the internal organs of men and dogs. These cystic forms have the power to multi-

TÆNIA ECHINOCOCCUS FILLED WITH EGGS. (Cobbold.)

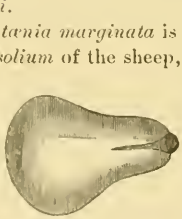
ply indefinitely, and sometimes with fatal results. Many of the bladders of water found in the internal organs of animals are cysts of the *echinococcus*.

HEADS IN THE CYSTIC FORM OF THE ECHINOCOCCUS.

HEAD OF THE TÆNIA CUCUMERINA.

The *tænia cucumerina* has its larvæ form in the dog-louse *trichodectes cani*.

The *tænia marginata* is got from sheep and pigs, and resembles the *tænia solium* of the sheep, but having the first row of hooks somewhat



CYSTICERCUS TENNICOLLIS, (CYST OF TÆNIA MARGINATA.)

HEAD OF TÆNIA MARGINATA.

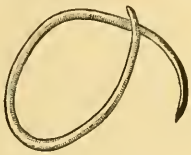
shorter. Its cystic form is known as *cysticercus tennicollis*, and is often found in other animals, both ruminants and omnivora.

The *tænia serrata* is a common tapeworm of dogs that hunt rabbits and hares, in eating which they find the cystic form (*cysticercus pisiformis*) in the entrails.

The *tænia cœnurus* is got from the brains of herbivora, the cystic form being *cœnurus cerebralis*.

The cat has two tapeworms, but we need not tax the reader's patience further by giving their technical names and description. The five cuts on the opposite page are all, of course, greatly magnified.

Round worms.—The round worm (*ascaris marginata*) is the common worm of dogs. They often exist in very large numbers, and do a great amount of damage. Sometimes they are distributed along through the intestines, and sometimes they congregate in bunches half the size of a



ROUND WORM OF DOGS, NATURAL SIZE.

ROUND WORM OF THE CAT, NATURAL SIZE.

man's fist, and not infrequently they crawl through into the stomach. They are from two to four inches long.

The maw-worm.—This is nothing but a section or sections of the tapeworm,—an unscientific designation, of course.

Round worm of the cat.—The cat has a round worm (*ascaris mystax*), that is equally as injurious as the round worm of dogs. It also inhabits the human intestines.

Symptoms of worms.—The general symptoms of worms are a capricious appetite; dry, staring coat; thinness of flesh; a hacking cough, with a desire to vomit, and sometimes actually vomiting worms; irregular bowels; diarrhœa, or its opposite, constipation; and general unthriftiness. To these are sometimes added bloody passages and a pot-bellied appearance. If the dog gets much reduced, fits are apt to follow, and may cause death.

What to do.—For tapeworm, let the dog fast for twenty-four hours, and then give him a drachm of areca nut, coarsely powdered, made into a pill with syrup; four or five hours later give two tablespoonfuls of castor oil, and when this has operated give the following:

No. 19.
20 Drops oil of male shield fern,
1 Tablespoonful olive oil,
Mix.

Give as one dose. Examine the excretions carefully, to find the head of the tapeworm, and if this does not come away, repeat the above after two weeks. The above doses are for large dogs. To smaller ones give proportionately less, and less also to young dogs as compared with those full grown.

For the round worm give the following powder every morning for a week, on an empty stomach, and follow the last dose with a dose of castor oil—two tablespoonfuls—with ten drops of turpentine in it:

No. 20. 4 Grains santonine,
2 Grains sulphuret of iron,
20 Grains sugar of milk,
Powder and mix.

Give as one dose. Repeat the whole treatment at the end of three weeks.

VII. Worms in the Kidneys and Heart.

Giant strongle.—This worm (*eustrongylus gigas*) is found in the kidney. It is from one to three feet long, and half an inch in diameter, and is of a reddish pink color. After destroying the kidney,—literally eating it up,—it attacks Glisson's capsule (covering the kidney), perforates it, and falls out into the abdominal cavity, where it causes death from inflammatory action in a short time.

Filaria imitis.—This is an exceedingly small worm occasionally found in the heart, and causing death suddenly.

What to do.—For these two worms nothing can be done. If fits are troublesome, give No. 9 occasionally.

VIII. Surfeit.

Dogs that are kept in too close confinement, and are over-fed, suffer inevitably from surfeit, shown by plethora, pimples on the skin, etc., and sometimes by a mild form of fits or vertigo. Give one drachm of jalap made into a pill with syrup; reduce the feed, and give more exercise.

IX. Abscesses and Phlegmonous Tumors.

These occur frequently in weakly dogs that have been debilitated by disease, especially by distemper, and sometimes as a consequence of an impure state of the blood. The latter condition is common in puppyhood. They usually come around the jaws and throat, sometimes as large as a man's fist; they come to a head and break, discharging a blackish watery pus, run a few days, and heal up.

What to do.—They may be hurried by poulticing, and opened when soft. Inject the following lotion three times a day:

No. 21. 2 Drachms of carbolic acid,
1 Pint of water,
Mix.

If debilitating disease is the antecedent circumstance, give the following powder morning and night for a week:

No. 22. 3 Grains sulphate of iron,
4 Grains saltpetre,
½ Drachm of brown sugar,
Powder and mix.

If, however, the dog is in good heart, the above will not suit. Give this:

No. 23. 1 Teaspoonful cream of tartar,
1 Tumblerful of water,
Mix.

Give two tablespoonfuls every morning.

X. Fractures and Wounds.

The feet of dogs often get sore from the pricks of thorns and irritating grasses, or long continued exposure to cold water, etc. This should be attended to at once. Remove the foreign body, if any is found upon examination, and apply a poultice till all inflammation is gone; then bathe the part twice a day with the following lotion, (bandaging loosely to prevent his licking it):

No. 24. 1 Ounce sugar of lead,
1 Pint of water,
Mix.

If the dog has been badly bitten, and the skin torn, sew up the wound, and dress three times a day with No. 21. If bones get broken, set them as straight as possible, and do them up in starched bandages, and splints. The splints must not be too heavy, but somewhat pliable. Place one on the front and one back and outside. Leave them on four weeks.

XI. Diseases of the Genitive Organs, Obstetrics, etc.

Of diseases under this head, gonorrhœa is that most often met with in the dog, frequently coming on without any assignable cause. It will be known by the matter seen dripping from the end of the sheath or clinging to it. Syringe out the parts with tepid water, and afterwards with the following lotion:

No. 24. 2 Drachms sugar of lead,
½ Pint of water,
Mix.

Inject a little twice a day.

Following parturition, the bitch sometimes has afterpains so severe and prolonged as to produce a partial or complete inversion of the womb or vagina, when the parts may be seen protruding, and forming a difficulty not very easily managed. If seen soon after the inversion, replace

the organ by pushing it in with the finger, and after injecting recipe No. 4, tie on a harness and bandage over the parts. Keep these on for a day or two, or longer if necessary. If not seen till the parts have become indurated and cold, bathe them with warm water, and after applying lotion No. 4, try and push them back. If all efforts prove unavailing, they may be excised, by tying a cord around the parts close to the body and then cutting off. Dress with recipe No. 21 three or four times a day.

During parturition do not meddle too much. If, however, a puppy should be too long in the passage,—half an hour or more,—give some assistance, but gently, so as not to injure either the bitch or puppy. Keep her warm, and feed on light, easily digested food, such as soup, mush and milk, etc. for a few days; then if there are no signs of fever her diet may be made more hearty and abundant. While giving milk, she should have some cooked meat every day. Sometimes the appetite fails while suckling the puppies, and then she runs down terribly. In this case, feed the puppies on boiled milk, and give the bitch recipe No. 22, for a few days. The puppies may be put with the bitch three times a day for a few minutes, but then removed, to avoid worrying her.

In case of swelling and soreness of a teat, or part of the udder, bathe it with warm water several times a day, and when dry rub well in the following lotion:

No. 25. 1 Ounce gum camphor,
4 Ounces olive oil.
Mix.

If the puppies should all die, great care will be required to keep down the inflammation in the teats. Milk them two or three times a day, and treat as above. The puppies should be weaned between the age of four and six weeks.

Dogs may be castrated at any age or any time of year, but not during extremes of weather. If done at an early age, the dog will grow larger, and is not likely to become fat and lazy, as is the case with old dogs thus operated on. Bitches may be spayed at any age, but six months is the best age. It may be done either through the right side or in the median line in the belly, a little back of the navel.

XII. Chorea.

The nervous system of dogs is very sensitive and easily deranged. The most common trouble is chorea, which is a quick, nervous jerking of any part, but most commonly of the head, neck and fore parts. Sometimes only one leg or a shoulder is affected, and sometimes the whole body. It may be so bad as to make the dog utterly useless.

When this condition is coming on it is painful, and causes him to whine and otherwise manifest uneasiness, but after it has become chronic it is painless, and does not much injure the dog for work, except in extreme cases.

It usually follows debilitating diseases, especially distemper. During recovery from these diseases the dog should always have a tonic, which will often prevent it; but once developed, chorea is incurable. A tonic, however, will be in order at any time. Give No. 22, or the following:

No. 26. ¼ Grain nitrate silver,
Bread crumbs sufficient.
Make a pill.

Give as one dose, and repeat morning and night for a fortnight.

XIII. Tetanus or Lockjaw.

Tetanus is very rare in dogs, and it is well that such is the case, for it is nearly always fatal. No definite treatment can be prescribed.

XIV. Paralysis.

This is quite common, and, happily, it yields readily to treatment. It begins by a staggering gait in the hind quarters, and grows rapidly worse till the dog has no power over them at all, but will drag them around by the movement of the fore parts. It usually follows distemper, but sometimes results from a bad cold, or from an injury to the back, or from worms. Clip off the hair over the loins, and apply the following to the back, along the spine:

No. 27. 1 Stick lunar caustic,
1 Teaspoonful of water,
Mix.

Paint it on with a camel's hair brush. Give internally a course of nux vomica, as follows:

No. 28. 1 Drachm powdered nux vomica,
2 Drachms gentian,
2 Drachms iodide of potash,
Simple syrup to mix,
Make 30 pills.

Give quarter of a pill morning and night for three days; then increase it to half a pill for three more days; then to three-quarters of a pill for a like period, and finally a whole pill. Then, if the dog is small or young, continue it at that till definite action of the remedy is noticed. This will be shown by rigidity of the muscles and stiffness of the legs, say half an hour or an hour after taking the pill. If it is a large or old dog, continue to increase the dose up to two pills; then keep along at that till the symptoms above described are noticed. These symptoms, in any case,

require the pill to be stopped. In giving anything larger than the smallest dose, great care should be taken not to omit a dose, since in that case the next dose might kill.

Repeat the blister on the back, if necessary. Feed on nourishing light diet, keep him clean, and keep the bowels open with occasional doses of castor oil. During recovery do not allow him to walk about too much, as fatigue is injurious.

XV. Poisons and Their Antidotes.

When a dog has been poisoned, the first thing to be done is to give an emetic,—a teaspoonful each of mustard and salts, in a little lukewarm water. If this does not vomit him in a minute, repeat it, and if it still does not act, give half a teaspoonful of powdered blue vitriol in a little warm water, or the same quantity of sulphate of zinc; then give a few swallows of milk, or a raw egg, or a little olive oil. A tablespoonful of the last named may be given every five minutes, for half an hour; also a few raw eggs. These are to moderate the corrosive or otherwise destructive action of the poison upon the tissues that line the stomach and bowels. For chemical antidotes, (to counteract the effect on the blood, nervous system, etc.), refer to the chapter on Poisons, in the Horse department, (pages 465–471), regulating the dose to suit the animal. A dog of average size requires about the same dose of everything as an adult man, or about one-twelfth of the dose for a horse.

PART XII.

BEES.

HISTORY AND CHARACTERISTICS, WITH DIRECTIONS FOR THEIR SUCCESSFUL MANAGEMENT.

BEES.

CHAPTER I.

VARIETIES AND PECULIARITIES OF BEES.

I. NATURAL HISTORY OF BEES.——II. THE THREE GENDERS OF THE HONEY BEE.——III. VARIETIES OF THE HONEY BEE.——IV. THE SO-CALLED QUEEN OR MOTHER BEE.——V. THE NUMBER OF EGGS LAID.——VI. DRONES OR MALE BEES.——VII. NEUTER OR WORKER BEES.——VIII. VARIETIES OF HONEY.——IX. WAX AND HOW IT IS FORMED.——X. PLANTS ADAPTED TO THE PRODUCTION OF HONEY.

I. Natural History of Bees.

In all times, and among all nations and tribes, however savage, the honey bee has been held in high esteem. Among savages and barbarians bees have always been prized for the stores of sweets they produce, and among more civilized people, for the interest attached to the study of their peculiarities and habits, as well as for the value of the honey as an article of food or luxury.

The honey bee belongs to the order *Hexapods*, that is true insects; and to the sub-order *Hymenoptera*. This sub-order includes wasps, ants, sand-flies and ichneumon flies. The group comprises insects having a tongue for taking liquid food, as well as strong jaws for gnawing and biting. The family to which the honey bee belongs (*Apidæ*), includes all insects which feed their young or larvæ on pollen and honey.

Insects of this family have broad heads; also antennæ or feelers, usually thirteen-jointed in the male, and only twelve-jointed in the female; the jaws (*mandibles*) very strong, often toothed; the tongue (*ligula*) long; the second jaws (*maxillæ*) one on each side of the tongue, also long; and the tongue, when not in use, generally folded back once or twice under the head. The *larvæ* are footless, maggot-like grubs, which are fed on honey and pollen; and a peculiarity of the honey bee is, that the neuter egg may be changed during its growth, by the workers, when necessary, so that the fertile or mother form (queen) is produced.

The mother bee is impregnated but once, and lives several years laying eggs, producing neuter bees or males, apparently at will, though probably according to a natural law not yet fully understood. The worker bees live not over one year, and the males are destroyed at the end of the first

summer's growth. This much must suffice, since the object is not to write a dissertation on the natural history of the honey bee, but simply to give such information as will assist the practical farmer in keeping such a number of swarms as his range will support, without seriously interfering with the ordinary labor of the farm.

There is a poetry lingering about the subject of bees and bee-keeping, that probably will never be eradicated from the human mind, a feeling that has come down from the earliest antiquity, and fostered from generation to generation, among all peoples, especially so until the production of other sweet substances became possible to man. Another reason, and perhaps the key note to the poetry of the subject, is the curious as well as perfect economy of this interesting species, in all its details.

II. The Three Genders of the Honey Bee.

We find these interesting insects living in colonies of many thousands, apparently under an intelligent system of government, composed of three distinct classes. These are the female, or mother bee, the neuters, or workers, and the males. The single female in a swarm has, for her sole province, to lay the eggs from which the young are hatched; the males

QUEEN BEE.

DRONE.

WORKER.

or drones have no other duty save that of impregnating the single female once, thus rendering her fertile for life; the worker bees, whose gender is neuter, gather all the food, prepare the wax, build the cells, store the honey, feed the young larvæ bees, clean the hive, and perform all the labor. These three classes of bees are represented by the cuts; the outlines are all enlarged, but retain the relative proportions each to the others. Thus, the young bee-keeper may readily distinguish each variety of bee at sight. For the want of such object lessons we have known old men who had, as farmers, kept bees all their lives, unable to distinguish one from the other, and, in fact, who had never seen the mother bee at all.

III. Varieties of the Honey Bee.

Our domestic bee belongs to the *Apis Mellifica*, and is a native of the Eastern Hemisphere, none having been known in the western half of the globe, until brought here from beyond the Atlantic; but once introduced, they have taken kindly to our climate, and are now spread over the whole of North America where the winters are not too severe, since their natural instinct of swarming enables them easily to escape from domestication. The varieties of the honey bee best known are the Black, or German bee, and the Italian, or Ligurian bee, both of which varieties were known as long ago as the time of Aristotle, 400 years before Christ. The so-called Black bees are not really black, but a gray-black. The specific distinction between the two varieties above mentioned was first made by Spinola, in 1805, who called one the German, and the other the Ligurian, the name Italian being a synonym, adopted lately for the reason that the first well-known importation of them to the United States was from Italy. In 1859, these "Italians" were imported simultaneously into England and the United States from Germany, and the next year an importation was made direct to the United States from Italy, where they were systematically kept; and now they are generally disseminated throughout the United States and Canada.

The German bees are pretty much self-colored. The Italians are easily distinguished by the bright yellow rings—three in number when the breed is pure—at the base of the abdomen.

The Egyptian bees (*fasciata* or banded) are broadly banded with yellow. They are smaller, more slender and yellower than the Italians, and are supposed to be the bees mentioned in scripture. Vogel states that they gather no propolis; they are also reported to be active, to stand the cold well, and to be cross and more liable to sting than either the German or Italian. Italian bees are credited with being the best natured of any, a matter not difficult to account for under the laws of heredity, since they are the oldest of thoroughly domesticated bees.

Another variety of bees that has received attention is the Cyprian bee, which is yellow, and undoubtedly a variety of the Italian. A variety of Italians has recently been sold, called Albinos, from their white hairs; the probability is that all Italian bees have these white-haired individuals naturally among them. The Carnolian, the Heath, the Herzegovinian, and the Krainer bees are also described by fanciers. In these days of sharp practice there are yearly candidates for the farmer's money on every hand. Our advice is that farmers stick to the German and Italian; they are good enough for every day use.

IV. The So-Called Queen or Mother Bee.

The mother bee has no sovereign attributes, though the ancients called her the King, and hence our name Queen, adopted since her true gender became known. She is simply a perfectly developed female with ovaries occupying nearly the whole of her abdomen, which, as shown in the cut, is of great length; and the spermatheca, capable of being compressed at will, is capable, according to Leuckart, of containing 25,000,000 spermatozoa. Hence, the mother bee may lay fertile or infertile eggs at pleasure. She is longer than either the drones or workers; her wings are shorter; and although armed with a powerful sting, she seldom uses it. It has been a mooted question, whether it be possible for the mother bee to be impregnated except while on the wing; the probability is that she can only be thus rendered fertile, the male losing his life with the accomplishment of the act.

V. The Number of Eggs Laid.

The energy with which the mother bee lays eggs is startling. It is her sole province to keep the colony populous, and since the life of the worker is short, her activity must be fully employed, during mild weather. She is capable of laying from 2,000 to 3,000 eggs a day when necessary, and has been known to lay six eggs in one minute. That most careful observer, Berlepsch, says he had a queen that laid 3,021 eggs in twenty-four hours, by actual count, and 57,000 eggs in twenty days; that this queen continued prolific for five years, and must have laid more than 1,300,000 eggs at a low average during this time. Other careful observers, notably Dzierzon, say queens may lay over 1,000,000 eggs.

VI. Drones or Male Bees.

The drones are the male bees, and their presence or absence often seems to be determined by the necessities of the colony. It is probable that, if allowed, the drones would live as long as the worker bees; but from May to November is the time when they are usually found in the hives. The usual number in a hive is from two hundred to three hundred, but less than half this number may safely be left by the bee keeper to ensure the impregnation of the young queens at swarming time. The worker bees kill all remaining drones in the autumn, usually before hard frosts occur. An unimpregnated queen will lay eggs producing drones only, but after fertilization can lay either worker eggs or those producing male bees, apparently at will.

VII. Neuter or Worker Bees.

The worker bees are undeveloped females, that is with abortive ovaries; sometimes, though rarely, they become so far developed as to lay drone

eggs. How this happens is not certainly known, but the probability is that they may have been partially fed with the food used in producing queens. This is the opinion of Burlepsch, and Langstroth, but the opinion of Huber is, that, reared near royal cells, they received the same food accidentally. They do not differ from the ordinary worker except in the power of laying eggs as stated. The number of workers in a hive will range from 1,500 to 4,000, and even more; about 3,500 should be contained in every strong colony of bees.

The worker bees are peculiarly constituted for the work; the tongue, labial *palpi* and jaws are long, and the tongue hairy, enabling them easily to lap up their liquid food. When filled, the tongue is doubled back, and disengaged of its load by the inclosing *palpi* and jaws, and the load is sucked into the honey bag. The bees have, also, the power of injecting the contents of the honey bag for feeding bees, or for filling the honey cells. The jaws are strong, with semi-conical cutting edges, so they may cut comb, knead wax, and perform the other work intended by nature. Their eyes are like those of the queen, but the wings are longer and, like those of the drones, reach the end of the body when at rest. The three cuts on page1094will show the differences perfectly.

On the outside of the posterior limbs next the body, is a rim of hairs, forming what is called the pollen basket. The pollen is gathered by the organs of the mouth, and carried back by the four anterior legs. On the anterior legs is a notch covered by a spur; its use is not well known. The sting of the worker is strong, sharp and straight, unlike that of the queen, which is curved. The gland which secretes the poison is double, and the poison sack is the size of a flax seed. The sting is triple, and armed with barbs. Hence the sting is not easily withdrawn when once fully inserted, and hence the bee so stinging loses its life, since the sting and a portion of the alimentary canal are left in any tenacious substance it may penetrate, as the skin of the hand for instance.

VIII. Varieties of Honey.

Natural honey is the fluid nectar of flowers. It undergoes slight modifications in the honey bag of the bees, and is somewhat changed chemically, but retains the flavor, and to a certain extent, the aroma of the flowers from which it is gathered. Hence, certain districts noted for special plants, and aromatic flowers, produce highly prized honey, while other districts produce unwholesome honey from the noxious or poisonous flowers. Thus in ancient times, the honey gathered in the district of Mount Ida was famous for its excellence, while that of Trebizond was abhorred.

Honey contains grape sugar, manna, gum, mucilage, extractive matter, the odor of the flowers from which it was taken, and a little wax, pollen

and acid. In fact, it is said that under the microscope, the pollen contained has determined some of the flowers from which the honey was taken. When first drawn from the comb the honey is quite fluid, but in time candies, as it is termed, that is, the solid glucose separates from the fluid parts, and is identical, chemically, with grape sugar; nevertheless the solid and fluid parts are not essentially different. All honey tends to crystalize with age, and become yellow.

The adulterations of honey are various. That from glucose ("corn sugar") is the most difficult of detection; starch, chalk and other solids, may be detected by heating the honey, whereupon these impurities will settle to the bottom. Of late years the filling of old comb with glucose has been so largely practiced, that it is not safe to buy any but white comb, capped over. Hence pure comb, capped by the bees, commands two or three times the price of strained honey.

IX. Wax and How It is Formed.

The wax used by bees in the formation of the cells is a solid, unctuous substance, secreted by the bees in pellets of an irregular pentagon shape, on the under side of the abdomen: it is in very thin scales, secreted by and moulded upon the membrane towards the body from the wax-pockets. There are four wax-pockets on a side, and thus eight scales may be secreted at a time.

Wax is a costly product for the bees, the production of one ounce of wax requiring the consumption of about twenty ounces of honey. Hence, modern ingenuity has invented a machine for pressing out thin scales of wax of the true hexagonal shape, although the natural combs are not true hexagons. The formation of the comb by bees is one of the most interesting and wonderful things in nature. The walls of a new cell are only 1–180th of an inch in thickness, and so formed as to combine the greatest possible strength with the least material, and the least cost of space. The drone cells are about one-fifth larger than those of the workers, the diameter of the worker cells averaging little more than one-fifth of an inch, while drone cells are a little more than one-fourth of an inch, or, according to Reamur, respectively two and three-fifths lines, and three and one-third lines.

Comb, when first formed, is always transparent; when dark, it has become so from being used as brood comb, the color being due to the cocoons left in the cells. When used solely for honey, they are often drawn out even to an inch in length. The capping of the brood-cells is dark, porous, and convex, while the capping of those in which honey is stored, is white and concave.

X. Plants Adapted to the Production of Honey.

Aside from artificial feeding, the practice of which will hardly be adopted and cannot be advised among farmers, or those who do not make bee-keeping a special business, the prevalence of honey-bearing plants must be specially considered, in deciding upon the number of hives which may be profitably kept. It is generally supposed that garden flowers are a prolific source from which bees get their stores; such, however, is not the case. In the West those annuals or perennials prolific in honey are, many of them, spicous, and of great value aside from this use. Of the clovers, the Alsike, the White, and the Sweet clover are eminent for their bee-feeding qualities. The last named is of no value except as bee pasturage.

Bee-keepers have been accused of purposely sowing this fragrant weed for this purpose, much to the annoyance of farmers, and it cannot be denied that it has become largely prevalent where bee-keeping is established as a distinct industry. These plants bloom in June and July, while red clover is not available as bee food until the second growth is in blossom, after harvesting the first crop for hay. The earliest bloom will come from dandelion, the strawberry, and other wild and cultivated plants, and the observing bee-keeper must be governed by the prevalence of bloom, in estimating how many swarms may find forage during April and May—a most trying time for bees. In May and June the sumac and the white sage are valuable in California, while in the South the cotton plant is a prolific source of honey from June until frost; and during this time, in various parts of the country, mustard, rape, the milk weeds, and St. John's wort, yield abundant stores of honey. In July, corn is the great honey-producing plant all over the West; in August, and thence until frost, buckwheat is the great honey producer; and during the later season, the vast array of wild flowers will be available, among them asters, golden-rod, the wild sunflowers, beggar-ticks, Spanish needles, tick seed, etc.

In all forest regions the bees feed upon the bloom of shrubs and trees, and in every locality upon orchard trees and bushes. The latter furnish abundance of blooms, the apple especially, and the best time to change swarms, or divide them, is when orchard trees are in full bloom.

The first trees to give bloom in the spring, are the red and white maples, the aspens and willows. South of 40 degrees the red bud (Judas tree) is prolific in its bloom. May gives us alder, sugar maple, haws, crab-apple, and nearly all fruit trees and bushes. Late in May and early in June we have the barberry, grape, white wood (tulip tree), sumac, and during June the wild plum, raspberry and blackberry; July will give

bass wood, Virginia creeper and button bush. In the South, all these trees thrive in the hill region; many of them we do not have in the West, among them the sour wood. In California the pepper tree and red gum, are noted for late bloom. When there is plenty of the plants we have named, the bee-keeper need not fear but there will be an abundance of bloom of many species indigenous, but not mentioned here.

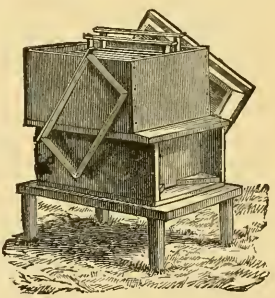
CHAPTER II.

THE GENERAL MANAGEMENT OF BEES.

I. HIVES.——II. NUMBER OF SWARMS PROFITABLY KEPT ON A FARM.——III. SWARMING.——IV. HIVING NEW SWARMS.——V. TAKING THE HONEY.——VI. WINTERING BEES.——VII. IMPLEMENTS OF USE.——VIII. A MOTHERLESS SWARM. ——IX. FASTENING EMPTY COMBS IN FRAMES.——X. FEEDING BEES.——XI. ENEMIES OF BEES.——XII. FOUL BROOD.——XIII. CONCLUSION.

I. Hives.

Whatever the hive used—the old fashioned close box hive is now-a-days obsolete—simplicity is the main feature to be considered by the farmer. Have nothing to do with a hive that is full of doors, drawers, traps, or any of these devices to catch the unwary. Leave these to experimental bee-keepers. If comb-honey in frames is desired, about 4,000 cubic inches should be the contents of the hive. If the surplus honey is to be contained in caps, 2,000 cubic inches and even less will be ample for the hive. In any event, the hive should be closely jointed, and carefully put together.



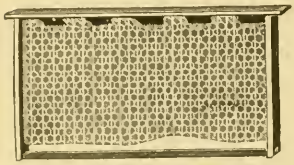
MOVABLE FRAME HIVE.

In our opinion the Langstroth hive, or some modification of this form is best, all things considered, for the farmer. Its patent has now expired, and the cut we give shows a hive that any carpenter can make, or the several parts can now be bought ready to be put together of any one dealing in bee-keepers, supplies, packed for shipment. Its working parts are easily adjusted; it is as near moth proof and vermin proof as any hive—none are really so. To the talent of Mr. Langstroth, who during his life labored continuously in simplifying the "mysteries of bee-keeping," is due, more than to any other one individual, the bringing of this interesting art within the grasp of all.

On the next page are given two illustrations, showing different forms of movable frames, the larger one filled with comb, while the smaller one has only a few cells. The smaller frame is only about six or eight inches

square, and, when filled with comb, will contain about a pound of honey. A number of them placed side by side, and joined together, will occupy the same space in the hive as the larger frame. The small frames are far more convenient for handling than the larger ones, and by their use the honey can be sold in the frames in quantities to suit retail buyers. Most of the California honey shipped eastward, comes in these small frames just as the bees made it.

SMALL FRAME.



MOVABLE FRAME FILLED WITH COMB.

As before said, whatever the hive let it be simple; and since none of the standard hives are now covered by patents, a practical man ought to be able easily to judge what suits his idea best. The cut will show one of the movable frames filled with a wired comb foundation, and may also be taken as showing a movable frame filled with comb.

II. Number of Swarms Profitably kept on a Farm.

The great mistake made by farmers in bee keeping is, that they are too eager to increase the number of their swarms. When a few swarms are kept the bees remain healthy and give plenty of surplus honey, because they find plenty of natural forage. Swarms, on the other hand, are extended until ten, twenty, fifty, and even more, are working; then come light crops of honey, disease, moth and other pests, and, at last, starvation puts an end to the experiment. Artificial feeding and precise care may, indeed, prevent this; but the farmer cannot spare the time from his other duties, though the specialist may. We have never been able to keep more than twenty swarms, even on one of the best of feeding grounds, without special care and feeding; and the greatest profit for the least outlay has been from ten or twelve swarms; some locations will not support more than half this number. Every farm range should keep five or six swarms nicely. Our advice, therefore, is, understock rather than overstock.

III. Swarming.

The proper time for bees to swarm is as early in the season as possible. If they have been properly wintered, that is, if they are strong, swarming will begin about the time apple trees are in full bloom. The old adage says,

> "A swarm in May, is worth a load of hay:
> A swarm in June, is worth a silver spoon;
> A swarm in July, is not worth a fly."

This it will be well for every farmer to remember. The early swarms become populous, and have plenty of honey before the dry season and heat cut off the honey supply, and can carry themselves through. The late swarm is weak, gets weaker, and finally succumbs to the inevitable.

IV. Hiving New Swarms.

In working about bees, at any time, and for whatsoever purpose, there must be no haste, sudden movements, or excitement of any kind. This is what causes stinging. If you crush a bee, or if it gets pinched in any part of your dress, you will be stung; if not, there is little danger, unless you go about your work in an excitable manner. If you are so unfortunate as to be stung, get out of the way as quietly and quickly as possible; the odor of the sting will excite the whole colony. It is well to protect yourself against stinging in the most perfect manner; a pair of buck-skin gauntlets tied securely over the cuffs of the coat, the bottom of the pantaloons tied firmly about the boot tops, thick, loose clothing, and a bee veil afford perfect security to even those whom bees dislike (hasty persons), and to those who fear bees (timid persons). A bee veil is simply a piece of bobinet, large enough to tie over the head, as shown in the cut, and which may be fastened by being tucked under the top of the coat, or tied about the collar.

BEE VEIL.

Have your hives ready, and all prepared beforehand. If the bees are settled upon a handy bush, simply shake them carefully into the hive, as many as you can; cover and place it near where the other bees may enter. If the greater part of the swarm fall on the ground, drive them to the entrance, by gently and carefully sweeping them with something soft. When they begin to enter, leave them alone until evening, when they must be set where they are to remain. If the swarm has settled upon a limb so high that it cannot be reached by a ladder, climb to it, tie a rope securely to the limb beyond where you wish to saw, let the end pass over a limb still higher, and thence to the ground. An assistant holds the end of the rope and eases the limb as it begins to be severed, so it comes down gently, and often without seriously disturbing the bees; pass it gently to the ground, put the bees into the hive, as before directed, and it will be found that this is about all the "mystery" in hiving bees. Watch for indications of swarming, and be ready, and you will seldom lose a swarm.

We never knew a swarm to go directly away without clustering, the first time they came out. Hence the beating of tin pans, and throwing water, or sand among an issuing swarm is all nonsense. But if they rise directly up and seem inclined to make off, a good dash of water or sand will often bring them down, probably on the principle that they think it a bad day for swarming. Wire swarm-catchers are sometimes used. A bushel basket on a suitable handle is excellent, when a swarm is to be shaken down from a limb.

V. Taking the Honey.

Never undertake to work about a colony of bees unless you are sure they are filled with honey. At the first alarm of any kind, tapping on the hive, or smoking, their first impulse is to fill themselves with honey, to be ready for any emergency. Once filled, which need not take more than five minutes, they are quiet, and will not sting unless they are hurt; proceed quietly then to remove the honey, and pay no attention to the flying bees—if you do you will get stung. A good form of smoker—very little smoking will do—is given in the cut. A few whiffs from a smoker's pipe answers very well. If any honey wished to be removed, sticks, loosen it or cut through it with a thin knife. The cut shows the best form of honey knife.

BELLOWS AND SMOKING TUBE.

HONEY KNIFE.

VI. Wintering Bees.

A good stand for bees is a simple shed, tight on the sides and facing the east; the roof should be water-proof; if then you have shutters for the front to be put up in winter, to keep out drifting snow, you have a good place both for summering and for wintering bees. Bees, of course, may be most economically wintered in a cold, dry, light, well-ventilated cellar; but this again belongs to the professional Apiarist, and wants nice management. The healthiest and best place for the farmer to winter bees is in such a house as we have mentioned, further protected with cornstalks, or straw mats. The hives should be placed within twelve inches of the ground; this is, also, the proper distance for summer. The main thing in summer is to guard against extreme heat, and in winter against driving storms, especially snow. Bees will stand extreme cold, if they are healthy, and the hive contains thirty pounds of honey in the autumn. They cannot stand wet, nor snow drifted among them in the hives.

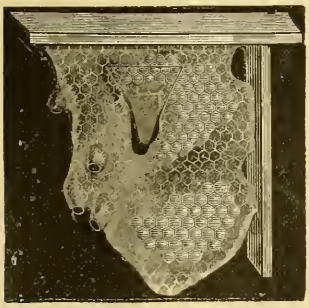
VII. Implements of Use.

In bee-keeping, as in every other art, certain implements and labor-saving appliances are needed. For taking honey from the hives, the bee veil, the smoker and the honey knife are all that is necessary; and where the honey is made in the small movable frames, already described, the knife is discarded. Indeed, the implements of use are but very few, so far as successful bee-keeping is practiced by the farmer. We have figured the smoker and the honey knife. A pipe of tobacco and any well tempered, thin knife will answer. There are centrifugal machines in use for extracting honey from the comb, when it is wanted to be again returned to the hive. A cut of a good form is given. This again belongs more to the professional bee keeper than to the farmer.

CENTRIFUGAL EXTRACTOR.

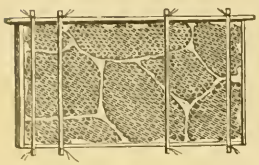
VIII. A Motherless Swarm.

Sometimes, from one cause or another, a colony of bees loses the queen or mother bee, and has no larvæ from which to rear another; or, the bee keeper may choose to divide swarms, giving a nucleus of three frames. These are taken from the center frames of other hives; take bees and all, but be sure the queen is left in the old hive, and shake among those in the nucleus hive the bees from two or three more frames, so that after the departure of those that will naturally leave and return to their old homes, enough will be left to keep up the requisite warmth in the hive. First, however, you must find a frame containing one or more capped queen cells; cut a triangular piece out of one of the frames to be inserted in the nucleus swarm, cutting away the bottom as shown in the illustration, so there shall be no danger of compression of the queen cell. Then cut a piece containing a queen cell from the other frame, and fasten it to the frame—see the illustration, also showing other queen cells—and after putting this in the nucleus hive, put in the other two frames and bees as directed. We could hardly advise the farmer bee-keeper to adopt this plan, but it is well to know how, in case it becomes necessary to furnish a queen cell to an unfortunate swarm


FURNISHING A QUEEN CELL.

IX. Fastening Empty Comb in Frames.

On page 1102 is a cut of a wired comb foundation; any comb even in pieces may be utilized by a little cutting and fitting, and temporarily fastened with wire or thin narrow strips tied top and bottom as shown in the annexed cut, until the bees secure it, which they will do in a day or two.

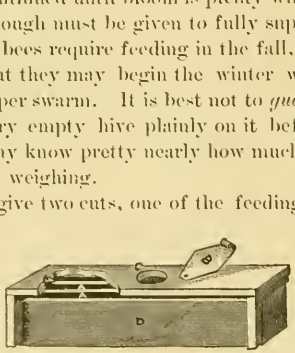


UTILIZING PIECES OF COMB.

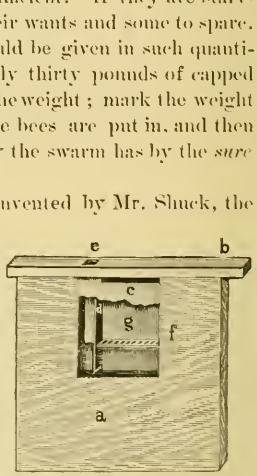
X. Feeding Bees.

If a swarm, from lack of forage, becomes insufficiently supplied with honey to carry them through the winter, or if it be found that they lack food in the early spring, they must be fed. The best thing is strained honey, of course; the only other admissible thing is granulated sugar made into a syrup of the consistency of honey. If the object be to stimulate bees to commence rearing brood early, a half pound to a pound of sugar a day, early in the spring and continued until bloom is plenty will be sufficient. If they are starving, enough must be given to fully supply their wants and some to spare. If the bees require feeding in the fall, it should be given in such quantities that they may begin the winter with fully thirty pounds of capped honey per swarm. It is best not to *guess* at the weight; mark the weight of every empty hive plainly on it before the bees are put in, and then you may know pretty nearly how much honey the swarm has by the *sure* test of weighing.

We give two cuts, one of the feeding box invented by Mr. Shuck, the other Professor Cook's combined division board and feeding box. Any suitable vessel that will hold honey, with a float on top, pierced with holes, that the bees can feed through, will answer well enough, and this may be placed in the upper chamber of the hive, secure from other bees.



SHUCK'S BEE FEEDER.

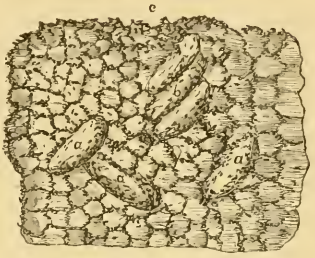


COOK'S DIVISION BOARD AND FEEDER.

XI. Enemies of Bees.

There are many enemies of bees, among them the mosquito hawk, or

BEE MOTH.



WORK OF THE LARVÆ IN COMB.

devil's darning-needle, as it is sometimes called. The bee-killer (*Asilus*) is a two winged fly, which seizes the bee and sucks its fluids. A Tachina fly has the reputation of laying its eggs in the bodies of bees occasionally. Large spiders rarely entangle bees in their nets. Ants sometimes depredate on bees. These, however, may be provided against, as may mice, toads, and the king bird. The worst enemy to bees is the moth, which, if a swarm is not strong, will soon ruin it entirely with the webs and larvæ. The moth lays its eggs in the minutest crack, and the young find their way into the hive, where they soon destroy the swarm by filling everything with their webs, as they progress. Their manner of working is shown in the cut entitled "work of the larvæ in comb."

XII. Foul Brood.

This fungous disease of bees, once it gets a foothold in an apiary, generally carries destruction with it. It is quite contagious; Schonfeld, of Germany, not only infected the healthy larvæ of bees with the germ, but other insects also. The symptoms are a steady decline in the colony; the brood becomes brown and salvy, and gives off a bad smell like that of putrefaction. The spores are in the honey and the bees eating this and feeding it to the young brood, infect them. A remedy said to be successful in eradicating the disease is as follows:

8 Grains salicylic acid.
8 Grains soda borax,
1 Ounce rain water.

Or in this proportion for the quantity needed. Uncap all the brood and throw the solution over the comb with a spraying machine.

XIII. Conclusion.

Those who wish to go into bee-keeping extensively must educate themselves by means of books written particularly on the subject of bees in all

the minutiæ of their care. What we have given is a guide to those who, like the writer, may wish to keep a few swarms of bees.

The trying time for bees in the West is the extreme cold of our winters, and the droughts of summer. These must be guarded against. The same care must be exercised with bees as with any other farm stock. No farmer of sense would overstock his pasture ; do not, therefore, imagine because bees have the power of flight that they can forage indefinitely. They cannot. Their extreme power of flight is about three miles. Their most economical working range is, according to our observation when the country was new, only about one-half mile. They must first find flowers before they can get honey. Hence our advice, before increasing your swarms largely, be sure those you already have are somewhat lazy.

It is not hard to tell if your neighbor's bees and your own are overlapping on the feeding grounds. Dust a little flour on a bee, after it has filled itself from a saucer of honey offered to it. See which way it flies, and if it flies away from home, be sure that either your neighbor is overstocked, or else that you have not enough. Remember, however, that a few heavy swarms are better than many weak ones. It is the honey you are after, and not numbers of swarms. In handling bees, do so deliberately and sagaciously, and you will not be stung. Do not make experiments largely in new hives, or in bee foods. Stick to a simple form of hive, and pure sugar syrup as food. Keep no more swarms than can easily forage to the full capacity of the hives. Take surplus honey as soon as it is ready, and keep plenty of empty boxes on hand for the honey harvest. But be very careful how you allow your cupidity to rob the hives in the fall, lest bees may not have enough to amply carry them through the winter, and fully up to the time when flowers are plenty.

GLOSSARY OF SCIENTIFIC AND OTHER TERMS, IN GENERAL USE, WITH THEIR DEFINITIONS.

Ablactation—A weaning or cessation from suckling.

Abomasum—The last or fourth stomach of ruminating animals.

Abdomen—The portion of the body containing the stomach and intestines; the belly.

Abnormal—That which is not natural or regular.

Abortion—The casting of the young in an unnatural manner, and before the proper time.

Abrade, Abrasion—To rub off, to wear away by contact, as rubbing off the surface of the skin, producing galls.

Abrupt—Quick, sudden; an abrupt turn or twist in the intestine may produce strangulation of the parts.

Abscess—A swelling and its cavity containing pus or matter. A cavity containing pus.

Abscission—The cutting away or removal of a part.

Absorb—Swallowing up, drinking in.

Absorbent—In anatomy, those vessels which imbibe or suck up, as the lacteals or lymphatics. In medicine, any substance, as chalk, magnesia, etc., used to absorb acidity in the stomach.

Absorption—The taking up by the vessels of the body of any substance either natural or unnatural, as the serum of dropsical swellings.

Acardiatrophia—Atrophy or wasting of the heart.

Acephalhæmia—Anæmia, or lack of blood, in the brain.

Accelerate—Growing quicker or faster, as an accelerated pulse.

Acid—Sour. The last fermentation before the putrid.

Acidulate—To make slightly sour, as with lemon, vinegar, or the mineral acids.

Accretion—Increase, or growing as an exostosis or unnatural growth of bone.

Aceni—Stony growths of the liver, resembling berries.

Acrid—Sharp, pungent, biting, irritating, as the strong acids.

Acute—Severe, sharp. In diseases, those which soon come to an end in contradistinction to chronic.

Action—The paces of a horse, either natural or acquired.

Actual—The production of an immediate effect, as by the use of a hot iron (actual cautery) in contradistinction to the effect of escharotics, as a caustic application.

Acupressure—Arresting hemorrhage, as by means of a needle passed twice through a wounded substance at the side next the heart.

Adamantine Substance—The enamel of the teeth.

Adenitis—Inflammation of a gland or glands.

Adermatrophia—Atrophy (wasting) of the skin.

Adhesion—A joining together, as the union of parts in healing.

Adhesive—That which adheres, as certain plasters.

Adipose—Fatty matter; belonging to fat.

Adolescence—The period between puberty (the age of procreation) and the full development of the physical system.

Adult—The age succeeding adolescence, and preceding old age.

Aerate—Mixing with air, as the blood in the lungs, by which it absorbs oxygen.

Ædœa—Genital organs.

Ætiology—Relating to the doctrine or probable cause of a disease.

Affection—Disease, or disease of some particular part.

Affinity—The attraction which causes particles of bodies to adhere and form compounds. That which causes substances to cohere.

Affluence—Determination of the blood or of humors to a part.

Albuminuria—That condition in which the urine contains albumen and an excess of urea, coagulable by means of nitric acid and heat.

Albumen—Substances, animal and vegetable, resembling the white of an egg.

Aliment—Solid or liquid substance taken as food.

Alimentary Canal—The bowels.

Alkali—Any substance which will neutralize an acid, as magnesia, soda, potash, etc.

Alkaloid—A salifiable base existing in some vegetables, differing from alkali in composition and general properties, and having nothing in common except their basic properties. Brucia, emetia, morphia, strychnia, etc., are alkaloids.

Alter—A term in common use for castration.

Alterative—A medicine changing the functions and condition of the organs of the body.

Alum—Sulphate of alumina and potassa.

Alveoli—The sockets in the jaw bone in which the teeth are situated.

Amaurosis—Partial or total loss of vision from paralysis of the retina.

Amputation—The operation in surgery of cutting off a limb.

Anæmia—Poverty of the blood as opposed to plethora. Too few red corpuscles and too many white corpuscles in the blood.

Anasarca—Dropsical swellings as of the limbs, abdomen, chest, etc.

Anbury—A soft spongy tumor.

Aneurism—Dilatation of an artery producing a tumor; lesion of an artery; dilatation of the heart.

Analysis—Separation into parts; resolving into the original elements.

Anatomy—The art of dissecting, or separating the different parts of the body. The science of the structure of the body, as learned by dissection.

Anchylosis—The stiffening or rendering rigid a joint.

Anæsthetics—Agents which deprive of sensation and suffering, as chloroform, ether, etc.

Anodyne—A medicine to allay or diminish pain.

Anomalous—Deviating from the general character or rule.

Antacid—Opposed to or an antidote to acids.

Antagonism—Opposed in action; one contradicting another.

Anterior—Before; in front of another part.

Anthelmintic—Medicine to kill or expel worms.

Antidote—That which counteracts hurtful or noxious substances. A remedy to counteract the effects of poison.

Antiperiodic—Medicine to arrest or retard the return of a paroxysm in periodic disease.

Antiseptic—Agents for preventing, arresting or retarding putrefaction.

Anus—The fundament, or lower portion of the bowel at the tail.

Aperient—Laxative medicine; that which gently operates on the bowels.

Aphtha—Ulceration of the mouth, beginning with minute vesicles and ending in white sloughs.

Apoplexy—Sudden effusion of blood into the substance of the brain. Sometimes used for effusion into the substance of other organs or tissues.

Approximate—Coming near to. An approximate cure is by inoculating for another disease.

Aqueous—Watery; having the property of water, as watery matter, aqueous pus.

Aromatic—Strong smelling stimulants, given to dispel wind and relieve pain.

Artery—Blood vessels which carry the red blood from the heart.

Articulate—Joining, working together or upon one another, as the bones.

Asthma—A disease attended with difficulty of breathing, and a sensation producing wheezing, coughing and other distressing symptoms.

Asphyxia—Death from strangulation of the lungs, from want of air.

Asthenopia—Weakness of the sight or vision.

Assimilate—To make like another; assimilation of food in the nutrition of the body.

Astragalus—The largest bone of the hock-joint, lying below the os calcis.

Astringent—That which causes contraction of the bowels or vital structures. Astringents are medicines which suppress discharges, as from the bowels, blood, mucus.

Attenuate—To draw out, to make thin, reduce in size.

Atrophy—Wasting of a part, as the muscles.

Atlas—The first bone of the neck or first cervical vertebra.

Atony—General weakness, want of tone.

Augment—To increase.

Auricle—The external part of the ear; also parts of the heart, one on each side resembling ears.

Auscultation—The act of listening to sounds given by different parts of the body when struck, especially to the sounds produced by the functional motions of the lungs and heart by percussion.

Balk—To refuse to pull, or to refuse to go forward at command.

Bars—(Of the hoof.) The two ridges of horn, passing from the heels of the hoof toward the toe of the frog. (Of the mouth.) The transverse ridges on the roof of the mouth of the horse.

Base—The lower part, as the base of the brain; the foundation.

Beneath—Under a certain part.

Bicipital—Two headed, as biceps muscles, bicipital groove, etc.

Biliary—Belonging to or pertaining to bile. Biliary duct, a canal containing bile.

Biology—The doctrine of life, or of living bodies.

Bioplasm—The so called living or germinal self-propagating matter of living beings.

Biped—Two footed.

Bolt—To swallow the food hurriedly without proper chewing.

Bolus—Medicines formed into a round or conducical mass, for ease in administering, often termed a ball. The cylindrical shape is the proper one.

Boot—Buffer, a leather band, worn to prevent one foot cutting the other in traveling.

Bots—The grub of the fly *equus equi*, when in the stomach of the horse.

Bougie—An instrument for opening the urethra, or urinary, or other passages.

Bounded—Parts lying about another, surrounded by.

Breeding-in-and-in—Breeding to close relations, in the same sub-family, as the produce of the same sire but of different dams, or of the same sire and dam.

Broxy—A term often applied to a number of fatal diseases of sheep, especially to a form of anthrax or carbuncular fever.

Bronchia—The first two branches of the wind-pipe. Bronchitis is an inflammation of the bronchia.

Bronchotomy—The operation of cutting into the wind-pipe.

Cadaverous—Having the appearance of a dead body.

Cæsarian operation—To cut into the womb by way of the abdomen, when natural delivery cannot be accomplished.

Calcareous—Containing lime, lime-like.

Calculus—Any hard, solid concretion found in any part of the body, as stone in the bladder, gall-stones, etc.

Calefacient—Anything producing warmth.

Calks, or Calkins—The heel of the horse-shoe when turned down to prevent slipping.

Callous—Induration; a hard deposit; excess of bony matter.

Camel-backed—Hump-backed.

Canal—A tube or passage—as the alimentary canal, (throat), tympanic canal, etc.

Cancer—A hard, unequal, ulcerating tumor, which usually proves fatal.

Canine Teeth—The teeth between the lateral incisors and the small molars of the jaw.

Canker—Eroding ulcers of the mouth; virulent, corroding ulcers. Any sore which eats or corrodes.

Cannon-bone—The shank, or bone below the knee or hock. The metacarpal or metatarsal bone of the horse.

Cantharis—A coleopterous insect. The *cantharis vesicatoria*; powdered, it is the active principle in ordinary blistering plasters.

Canula—A hollow tube of metal or other substance, variously used in surgery.

Capillary—Hair-like; applied to the minute ramifications of the blood vessels.

Capped Hock—A swelling on the points of the hock of the horse.

Capsicum—Cayenne pepper. The small, long red pepper.

Capsular Ligaments—Ligaments surrounding the joints.

Capsule—A membranous bag or sac.

Carbon—Woody matter. Charcoal is impure carbon; the diamond is pure carbon. Carbonic acid is expelled from the lungs in the act of breathing. Carbonic oxyde in the blood or lungs is fatal to life.

Cardia—The superior or *œsophagal* orifice of the stomach; and of the heart.

Caries—Ulceration of the substance of the bones.

Carminatives—Warming, stimulant, aromatic medicines, used in colic and wind.

Carotid Canal—A canal in the temporal bone, through which the carotid artery, and also some nervous filaments pass.

Cartilage—Gristle; the substance covering the ends of bones, moving and working upon each other.

Casein—The nitrogenized constituent of milk. Blood fibrin and albumen is identical in composition.

Castrate—To geld, emasculate, deprive of the testicles.

Cataplasm—A poultice, either medicated or not. It sometimes takes name from the special agent employed, as *sinapism*, a mustard poultice.

Catarrh—A cold attended with running of the nose.

Cataract—An opacity of the crystaline lens of the eye, causing partial or total blindness.

Cathartic—Purgative medicine, used for freely opening the bowels.

Catheter—An instrument used for drawing the water from the bladder, and for other purposes.

Caustic—Any burning agent, as potash, nitrate of silver. To cauterize is to burn, generally applied to the use of the hot iron in diseases.

Carity—A depression, as the cavity of a wound.

Cellular tissue—The membrane or tissue which invests every fiber of the body, composed of minute cells communicating with each other, and which serve as reservoirs of fat.

Cephalic—Pertaining to the head.

Cerebral—Pertaining to the brain.

Cervical—The neck; belonging to the neck.

Characteristic—A symptom of character. Characterize, to distinguish.

Chalybeate—Containing iron. Any medicine of which iron forms a part.

Chemical—Relating to chemistry.

Chemistry—The science which investigates the composition of substances, and the changes of constitution produced by their mutual action.

Chirurgical—Belonging to surgical art.

Cholagogue—Medicines to increase the secretion of the bile.

Cholechloride—A medicine which increases the evacuation of the bile. Chole, the bile.

Chondritis—Inflammation of cartilage.

Choroiditis—Inflammation of the choroid coat of the eye.

Chronic—A lingering, long-standing disease, succeeding the acute stage. A seated, permanent disease.

Chyle—The milky liquid, as taken from the food during digestion, and prepared from the chyme, and ready to be absorbed by the lacteal vessels before being poured forth into the blood.

Chyme—The food modified and prepared by the action of the stomach.

Cicatrice—The scar left after the healing of a wound or ulcer.

Circumscribed—Limited. In pathology applied to tumors distinct at their base from the surrounding part.

Circulation—The vital action which sends the blood through the arteries, and back again through the veins to the heart.

Cleft—A mark; division; furrow.

Clyster—Liquid medicine injected into the lower intestine.

Coagulate—To clot, as the blood when drawn.

Cohesion—Connected; adhering together; sticking together.

Colic—Acute pain in the abdomen, intensified at intervals.

Collapse—A falling together. A closing of the vessels. Extreme depression of the vital powers.

Colon—The largest of the intestines, or more properly, the largest division of the intestinal canal.

Coition—The act of copulation; union of the sexes.

Coma—Lethargy. Drowsiness produced by depression of the brain and other causes.

Comatose—Constant propensity to sleep.

Conception—Fecundation by action of the male.

Condition—A healthy, serviceable state of the system. A firm state of the muscular tissue.

Congenital—Born with another; of the same birth. Belonging to the individual from birth.

Congestion—An accumulation of clogged blood in the vessels, or in the parts, as the lungs, brain, etc.

Constrict—Drawing or binding together, as constriction of the muscles of a part.

Contagious—A disease that may be communicated by contact, or the matter communicated, or proceeding from the breath, or emanations of the body.

Contorted—Twisted, twisting, writhing, as the body in pain, or from the result of disease.

Contusion—A bruise; a wound made by a blow or bruise.

Convex—Having a rounded surface. The opposite of concave.

Concretion—Adherence of parts naturally separate. In chemistry, condensation of fluids or other substances into more solid matter.

Condiment—Substances used to improve or heighten the flavor of food.

Confluent—Running together, as in pimples or pustules when they become confluent.

Constipation—A state of the bowels in which the evacuations are unnaturally hard. A stoppage of the evacuation of the bowels.

Continuity—Parts united so completely that they cannot be separated without laceration or fracture.

Convalescent—Returning to health after sickness.

Convoluted—Rolled together or upon itself. The cerebrum is convoluted. The irregular foldings of the intestines are convolutions.

Copious—Plentiful, abundant, as a copious discharge.

Core—The hard portion of purulent matter, as in boils.

Corn—A diseased portion of the foot,—in the horse, between the bar and the quarter, usually on the inside.

Coronet—The upper part of the hoof, just where it joins the skin.

Corrosive—That which eats away, destroying the texture of the living body.

Corrugation—Contracting the skin into wrinkles.

Costa—A rib. Costal: belonging to the ribs.

Counter Irritation—An application to irritate one part to relieve pain in another. A blister or mustard poultice produces counter irritation.

Cow-pox—Peculiar pustules upon the teats of cows, from which the vaccine matter is obtained, used to prevent contagion from small-pox, or to mitigate the intensity of the disease.

Cranium—The skull. Cranial: pertaining to the skull.

Crest—The back or upper part of the neck of the horse.

Crepitation—Applied to the noise made by the ends of fractured bones, when they grate together. The sound produced by pressing together cellular tissue in which air is contained.

Cribbing (*of horses*)—The act of seizing any hard substance, or pressing thereon with the teeth, and gulping; sometimes called wind sucking, though the latter is not necessarily cribbing.

Crisis—In disease, that point or period which determines a favorable or unfavorable termination.

Crop—The craw or first stomach of a fowl.

Cruor—The red colored portion of the blood.

Crupper—The buttocks of a horse.

Crural—Pertaining to the legs, as the crural arteries and veins.

Crust—The hoof, so-called. The outside laminæ of the hoof.

Crusta—A scab.

Cul-de-sac—A passage closed at one end.

Cuneiform—Formed like a wedge.

Curb—A soft swelling, becoming hard, situated on the back part of the hind leg, just below the point of the hock.

Cuticle—The epidermis or scurf skin. The skin is composed of the *cutis vera*, *reta mucosum* and *cuticula*.

Cutaneous—Of the skin, as a cutaneous affection.

Cyst, Cystis—A small bladder or sac; applied to those containing morbid matter or parasites, which become encysted, or inclosed in an envelop.

Cystic Duct—The duct which proceeds from the gall bladder, uniting with the hepatic duct.

Cystitis—Inflammation of the bladder. Cystoplegia is paralysis of the bladder.

Debility—The condition of weakness or feebleness.

Decoction—Extraction of the soluble parts of substances by boiling.

Decompose—To decay. To separate into component parts.

Defecation—Purifying from impurities of foreign matter. Voiding the excrement from the body.

Degenerate—To become worse or inferior.

Deleterious—Injurious, poisonous or destructive.

Delirium—Insanity; a wandering of mind in disease.

Deliquescent—Any salt which becomes liquid by attracting moisture from the air.

Demulcent—That which sheaths and protects irritated surfaces.

Dens—A tooth. Dental: pertaining to the teeth. Dentition: the development of the teeth.

Depilitory—Any agent or thing which causes the loss of the hair.

Dermal—Belonging to the skin.

Desiccate—To make dry by heat.

Detergents—Medicines having the power of cleansing the vessels or skin.

Develop—To increase. A disease develops its intensity. To show increasing muscular form. Bringing to perfection.

Diabetes—An excessive flow of urine containing saccharine matter.

Diagnosis—The distinguishing of one disease from another.

Diaphoretic—A medicine which causes perspiration or sweating.

Diaphragm—The midriff. The membrane, or broad muscle, which divides the thorax or chest from the abdomen or belly.

Diarrhœa—A continued and profuse discharge from the bowels.

Diet—Any kind of food or drink. Dietary: a regulated allowance of food.

Diffuse—To extend or drive out. That which may flow or spread, as a diffusible stimulant.

Digestion—The separation and dissolving of the food in the stomach. Digestive ointment has the power of resolving tumors.

Dilate—To open wide, as dilation of the eye.

Dilatation—The expanding of a body, as of the heart, arteries, the bladder, etc, from over-fullness.

Dilute—To make thin, as a medicine with water, with oil, etc.

Diminution—A lessening, or decreasing, as of pain, etc.

Diploma—A document granted by a legally chartered college, showing that the person named is entitled to practice his or her profession.

Disinfectant—An agent capable of neutralizing morbific effluvia, or the cause of infection.

Dislocation—Putting out of joint.

Disorganization—A complete morbid change in, or even total destruction of, the structure or texture of an organ.

Dissection—Exposing the different parts of a dead body, that their arrangement and structure may be studied.

Distorted—Deformed, crooked, out of the natural shape.

Distend—To stretch out, or swell.

Diuresis—An extraordinary or abundant excretion of urine.

Diuretic—A medicine to increase the flow of urine.

Doctor—In a common sense, applied to a person legally qualified to practice medicine. In its real sense, applying to various titles, as Ph. D., Doctor of Philosophy; D. D., Doctor of Divinity; LL. D., Doctor of Laws.

Domestic—Relating or belonging to the home or farm.

Dorsal—Pertaining to the back. The dorsal column: the back-bone.

Drachm—The eighth part of an ounce.

Drastic—Powerfully acting medicines or poisons.

Drench—Liquid medicine given by the mouth.

Drug—Originally, a medicine in its simple form, but now applied to medicines generally.

Duct—A tube for conveying a fluid or the secretions of the glands.

Duodenum—The first portion of the small intestine, through which the bile is poured.

Dura Mater—A fibrous, semi-transparent membrane, lining the cavity of the cranium, and containing the brain, (of which it may be considered the outer membrane), and protecting the same by its thickness and great resisting power.

Dysentery—Inflammation of the mucous membrane of the large intestines, producing mucous or bloody evacuations.

Dyspepsia—Serious derangement of the digestive functions.

Dysphagia—Difficulty of swallowing.

Dyspnœa—Difficulty of breathing.

Dysuria—Painful and incomplete passage of urine.

Ecbolics, Parturients—Agents causing the contraction of the womb.

Ectozoön—Parasites, as lice, infesting the surface of the body. Entozoa: parasites within the body.

Eczema—Small pustules crowded together, not contagious, but producing a smarting pain.

Effluvia—Morbid exhalations of the body; sometimes applied to animal and vegetable odors.

Effusion—A flowing out, as of the blood, water or lymph, into the tissues.

Ejection—Casting out, as ejecting improper matters from the stomach.

Elastic—The property of springing or stretching.

Elephantiasis—Chronic lymphangitis, by which the limb is enlarged, resembling the leg of an elephant.

Emasculation—Removal of the male generative organs; castration.

Embryo—The impregnated ovum in the womb, after growth has commenced.

Emetic—A medicine given to produce vomiting.

Emollients—Agents which have the power of softening or relaxing.

Empiric—One whose skill is experimental, or the result of mere experience.

Enamel—The hard outer covering of the teeth.

Encysted—Enclosed in a sac.

Enema—Medicines given by injection into the bowels.

Engorgement—In animals, vascular congestion, the result of over-feeding.

Enteric—Belonging to the bowels.

Enteritis—Inflammation of the bowels.

Enteroraphy—The sewing together of the divided edges of the intestines.

Epidemic—Disease that affects a large number, as though carried in the air.

Epiglottis—The covering of the glottis. A tongue-shaped projection, to prevent food or liquids from entering the wind-pipe.

Epizoötic—Contagious disease, attacking large numbers of horses at one time. Applied to catarrhal fever in influenza, which spreads rapidly.

Equine—Belonging to the horse.

Equitation—The art of riding on horseback.

Eruption—Pimples, blisters, rash, etc., breaking out on the skin.

Esophagus—The gullet, or tube of the throat which conveys food to the stomach.

Essence—The properties or virtues extracted from any substance.

Evacuate—To empty or pass out, as to evacuate the bowels.

Ewe-necked—In the horse, having a neck like a shorn sheep.

Exanthema—Eruption of the skin, with fever.

Excision—Cutting out, or cutting off, any part.

Excoriate—To tear or strip off the skin; to wear away or abrade; to break the skin in any manner, as in galling, or with acrid substances.

Excrement—Refuse matter. The dung.

Excrescence—Unnatural or superfluous growth.

Excreting—Throwing out from the body.

Excretion—The act of throwing off effete matter from the animal system; that which is thus thrown off.

Exfoliation—Separation or scaling off of dead from living bone. Separation of scales (laminæ) from any substance.

Exhale—Breathing out, evaporating.

Exostosis—Unnatural growth or projection of bone.

Exotic—Foreign. That which belongs naturally to another district than our own.

Extensor-tendon—The tendons which stretch out the limbs.

Extirpation—The complete removal of a part by means of the knife.

Extravasate—To let out of the proper vessels, as blood, after the rupture of a blood-vessel.

Extremities—The limbs.

Exudation—A sweating, or passing out of a liquid through the walls or membranes containing it.

Exude—To discharge through the pores.

Facial—Pertaining to the face.

Fæces—The excrement.

Farcy—A disease of the lymphatics of the skin of the horse. Also, a disease allied to glanders.

Fat—The well known animal substance, whose natural function it is to protect the organs, maintain the temperature, and nourish in case of need.

Febrifuge—A medicine to lower the temperature of the body, and counteract fever.

Feculent—Foul or impure matter, formed by the breaking down of the tissues; excrementitious matter.

Femur—The thigh bone proper.

Fermentation—Incipient decomposition of vegetable substances, from souring.

Fester—To suppurate, and discharge corrupt matter.

Fetid—Having an offensive odor.

Fibrin—An organic substance found in the blood, and composing a large part of the tissues of the body. Fibrous membrane: a membrane composed of fibres.

Fibula—The small or splinter bone of the leg. The outer bone of the hind leg of the horse, etc.,—much smaller than the tibia.

Filtration—Straining a liquid to clarify it.

Fissure—An opening, a crack.

Fistula—A deep, narrow ulcer, having a passage leading to it.

Fistulous—Resembling a fistula, either in form or nature.

Flanks—That part of the horse between the false ribs, hips and stifle.

Flatulent—Affected with, or caused by, the generation of gas or wind in the stomach and intestines, as flatulent colic.

Fleam—An instrument used for bleeding the larger domestic animals.

Flex—To bend, as the head, neck or limb; as, a muscle flexing the arm.

Flexor—A muscle whose office it is to bend a part; in opposition to extensor.

Florid—Red or scarlet like, from excess of blood in a part.

Fœtus—The young, yet unborn.

Fomentation—The application of warmth and moisture, as with a liquid or poultice.

Foramen.—A cavity pierced through and through.

Forceps—Long pointed pincers or nippers.

Fracture—The breaking of a bone.

Friction—Exciting circulation by rubbing.

Fumigate—The application of smoke or vapor.

Function—The office or duty of any part of the body.

Fundament—The anus or extremity of the bowel. The end of the gut.

Fungus—An unnatural growth resembling mushrooms.

Gall—The fluid contained in the gall-bladder, consisting, principally, of the bile secreted by the liver.

Ganglion—A collection or bunch of nerve fibers, causing the enlargement of a nerve, and resembling a knot.

Gangrene—The mortification or death of any part of the body, or of any of its tissues.

Gas—An emanation, or invisible fluid, generated in the body.

Gastric—Pertaining to the stomach.

Gastritis—Inflammation of the stomach.

Gelatine—Animal jelly.

Generate—To beget offspring; begetting or producing young; breeding.

Genital—Relating to reproduction of young, or to the generative parts.

Gland—A structure for secreting certain fluids of the body, and containing a tube.

Gestation—The condition of pregnancy, or being with young.

Glanders—An exceedingly contagious disease, which is incurable and fatal.

Gleet—Thin matter issuing from an ulcer. In horses, applied to nasal gleet exclusively.

Glottis—The narrow opening at the top of the windpipe.

Graminivorous—Feeding on grass and other vegetable food.

Granivorous—Feeding on grain or seeds.

Granulate—To grow or develop in the form of grains, as new flesh in the healing of wounds.

Gravel—Calculous matter found in the kidneys.

Gravid—The state of being with young.

Gullet—The œsophagus, or food pipe leading to the stomach.

Haggard—Worn down; thin; ghastly; deathlike.

Haunch—That part of the body which lies between the last ribs and the thigh. In the horse, the bony region of the hips.

Haw—The process of the eye-socket, which is thrown over the eye to clear it of foreign substances.

Hæmal—Relating to the blood.

Hæmatin—The coloring matter of the blood.

Hectic—A constitutional and remitting fever exhibited in consumption; produced also by ulcers, sores, etc.

Helix—The outer circumference or ring of the external ear.

Hemorrhage—A discharge of blood from the vessels containing it.

Hepatic—Belonging to the liver.

Hepatitis—Inflammation of the liver.

Hepatized—Converted into a liver-like substance.

Herbivorous—Feeding on herbs.

Hereditary—Inbred from the parents, as disease, color, vices, and other peculiarities.

Hermaphrodite—Possessing the attributes of both sexes, in a greater or lesser degree; being of, or including, both sexes. Said of animals, plants or flowers.

Hernia—Rupture, or soft tumor formed by the protrusion of any of the viscera of the abdomen.

Hippopathology—The science which treats of the diseases of horses; the leading branch of veterinary science.

Homogeneous—Being of the same kind or quality throughout.

Hue—Color.

Humor—Any fluid of the body, excepting the blood.

Humerus—The upper arm-bone; upper bone of the fore-leg.

Hybrid—The offspring of two different species of animals, as of the horse and ass (the mule).

Hydragogue—A medicine which removes effused fluids from the system.

Hydrocephalus—Water in (dropsy of) the head.

Hygiene—The preservation of health and prevention of disease.

Hypertrophy—Excessive growth.

Hypodermic—Beneath the skin. Used principally of medicines—as morphia, etc.,—applied by injection under the skin.

Hysterics—A nervous disability, mostly among females.

Ileum—The lower part of the small intestine.
Impotence—Inability to perform the sexual function.
Impregnation—The act of rendering, or state of being, pregnant.
Incision—Cutting into; a clean cut; cutting, as in any operation performed.
Incontinence—Inability to retain the natural evacuations.
Induration—The hardening of a part from the effects of disease.
Incisors—The front teeth of the jaws.
Infection—Communicating disease by miasma or emanations from a diseased body.
Influenza—An epidemic disease, causing general depression, with fever.
Infusion—Liquid produced by steeping an insoluble substance in water, without boiling.
Ingesta—Food taken into the stomach.
Inhalation—A drawing into the lungs; the inbreathing of medicated or poisonous fumes.
Inject—To throw in artificially, as from a syringe.
Injection—Liquid medicine thrown into a natural or artificial cavity.
Inoculation—The production of disease by virus or matter from a sore, communicated from one animal to another.
Instinct—Sense, as applied to animals.
Integument—The covering which invests the body (the skin), or a membrane covering any particular part of it.
Intercostal—Between the ribs.
Interfering—The cutting of one foot or leg with the other.
Intermittent—In fevers, a characteristic by which the paroxysms intermit or cease, returning at regular, or nearly regular, intervals.
Interstices—The minute spaces between the particles of a body.
Intestines—The bowels. The alimentary canal, leading from the stomach to the anus.
Invert—To turn about or upside down.
Invigorators—Strengthening medicines, or agents.
Iris—The circular membrane of the eye floating in the aqueous humor, and perforated to form the pupil.
Isomeric—Composed of the same elements in the same proportions, but chemically and physically different.
Issue—A running sore, artificially produced, and kept open to relieve irritation or morbid action in a neighboring part.
Jaundice—A diseased condition resulting from derangement of the liver, and characterized by great lassitude, and by yellowness of the eyes, skin and urine.

Jejunum—That part of the small intestines comprised between the duodenum and ileum.

Jet—The peculiar flow of blood from the arteries, in a spurting motion.

Jugal region—The region of the cheek-bone.

Jugular—The large vein of the neck.

Labial—Belonging or relating to the lips.

Laccrate—To tear. A lacerated wound is a torn wound.

Lachrymal—Pertaining to the tears. The lachrymal duct is the duct leading from the eye to the membrane of the nose.

Lactation—The act of giving suck, or time of suckling.

Lactiferous—Bearing or conveying milk; as, a lactiferous duct.

Lamella—A thin plate or scale of anything; pertaining to the anatomy of the hoof.

Laminitis—Founder; a disease consisting of inflammation of the parts between the pedal or coffin bone and the sensitive laminæ.

Lancinating—Sharp, acute, shooting; in a manner as if tearing; thus, a lancinating pain.

Languor—Weakness, faintness, debility.

Laryngitis—Inflammation of the larynx.

Larynx—The swell at the upper part of the wind-pipe, and extending into the throat.

Lateral—At or to one side.

Laxative—A medicine which gently opens the bowels.

Lens—In oculary anatomy, a portion of the eye situated immediately back of the cornea.

Lesion—Disease of a structure; any hurt or injury.

Levator—A general name for a muscle whose office it is to raise some part, as the lip or eyelid.

Ligaments—The bands of the joints binding them strongly together.

Ligature—Silk or flax thread, or any material suitable for tying arteries. A bandage used in the operation of bleeding.

Liniment—A fluid medicine employed externally and with friction.

Liquefaction—The act or process of reducing a solid substance to a liquid form.

Lithotomy—The operation of extracting stone from the bladder, by cutting.

Liver—The largest gland of the body, its office being to secrete the bile.

Lobe—A round projecting part of an organ.

Local—Confined to a certain part or district.

Lotion—A fluid applied externally, usually by means of a cloth kept constantly wet therewith.

Lubricate—To moisten, as the lubrication of the joints and moving parts by their appropriate fluids.

Lumbago—Rheumatism of the lumbar region.

Lymph—A transparent and nearly colorless fluid. The fluid contained in, and poured out by, the lymphatics.

Lymphatics—The vessels of animal bodies which contain the lymph.

Maccrate—Steeped almost to solution. Thorough soaking of a part in water previous to dissection.

Malady—Disease or ailment.

Malar—Pertaining to the cheek-bone.

Malanders—An ulcerous condition on the inside of a horse's legs.

Malaria—Infectious and noxious effluvia, from decomposing animal or vegetable matter.

Malformation—Badly or unnaturally shaped or formed.

Malignant—Severe; long; dangerous disease.

Mammal—Having an udder or teats for suckling the young.

Mammary glands—The glands which secrete the milk.

Mange—A contagious disease caused by the presence of acari in the skin.

Marrow—The fatty substance in the hollow of cylindrical bones.

Mastication—The act of chewing the food.

Materia medica—A term including all medicines or substances used in the cure of diseases.

Maxilla—The upper or lower jaw.

Mediastinum—The partition formed by the meeting of the pleura, dividing the chest into two lateral parts, and separating the lungs.

Medullary—Consisting of, resembling, or pertaining to, marrow.

Membrane—A thin animal tissue. The thin covering of the brain, bones and other organs.

Mental—Relating to the mind, or to the reasoning faculty.

Mesentery—The membrane which attaches the intestines to the spine.

Mesacolon—A process of the peritoneum to which the colon is attached.

Metastasis—The transference or removal of disease from one part to another, or such change as is succeeded by a solution.

Miasma—Impalpable germs, the product of putrefaction (animal or vegetable), producing disease.

Midriff—The diaphragm.

Milk fever—A fever preceding or accompanying the secretion of milk.

Morbid—A state of disease; the product or result of an unnatural state, as morbid humors; a failing, sinking state.

Mortification—The death of a part from gangrene.

Motor—That which causes, or is the instrument of, movement; as, the motor muscles.

Mucilage—A jelly-like fluid; one of the proximate elements of vegetables, abundant in slippery elm; the agent which lubricates the joints.

Mucus—The substance secreted by the mucous membranes, and effused upon the surfaces of the membranes, as the running of the nose in a cold.

Muscles—The organs of motion. The voluntary muscles constitute the lean meat, or flesh of animals.

Muscular fiber—Fibers composing the body of a muscle, disposed in distinct bundles

Mycline—The fatty substance in nerve tissues.

Myitis myosotis—Inflammation of a muscle.

Myology—The branch of anatomy treating of the muscles.

Myotomy—Dissection of the muscles.

Nævus—A natural mark or blemish; a birth-mark.

Narcoma—Stupor from the influence of opium or other narcotic.

Narcotics—Drugs which allay pain and produce sleep.

Nasal—Pertaining to the nose.

Naturalia—The parts of generation.

Nauseants—Medicines that sicken the stomach.

Navel—The umbilicus.

Necrosis—Death of a bone, or of a portion of bone.

Nephritis—Inflammation of the kidneys.

Nerves—The fibrous system which conveys sensations to the brain and through the body.

Nervous—Having weak nerves.

Neuralgia—A painful disease, or affection of, one or some of the nerves.

Neurotomy—The cutting or division of a nerve.

Neutralize—To destroy the force or effect of anything.

Nictitation—A quick and frequent winking of the eyelids.

Nitrate of silver—Lunar caustic.

Nutritive—Tending to nourish or build up; strong, healthy food.

Nutrition—The process by which the food taken is assimilated; to repair waste and promote growth.

Obesity—Exceeding fatness.

Oblique—Slanting.

Obliteration—Alteration in the appearance or function of a part preventing its action.

Occult—Hidden. Applied to diseases whose causes or successful treatment are not understood.

Ocular, oculary—Relating to the eyes.

Odontalgia—Violent toothache, usually from decay.

Oedema—Effusion of serous fluid into the cellular tissues, producing swelling.

Oil—Fluid fatty or unctuous substances, either animal or vegetable. Oils are either fixed or volatile; the former leave a greasy stain on paper.

Omentum.—The caul. A fold of the peritoneal membrane, covering the intestines in front, and attached to the stomach.

Omnivorous—Animals which eat all kinds of food. Swine are omnivorous, in the general acceptation of the term.

Opacity—Want of transparency; that quality of bodies by virtue of which they cannot transmit rays of light.

Optic—Relating to the sight, as the optic nerve; relating to the laws of vision.

Orbit—In ocular anatomy, the bony cavity in which the eye is situated.

Organ—The natural instrument by which a process or function is carried on.

Organic—Composed of, or pertaining to, an organ or its functions; dependent on, or resulting from, organism.

Orifice—The mouth or entrance to any cavity of the body.

Origin—The beginning or starting point of a thing.

Os—The technical name for bone.

Os calcis—The tip of the back.

Osseous—Bony, or resembling bone.

Os cheocele—Scrotal hernia. Any tumor of the hernia.

Ossification—Changing to bone. Bony formation.

Ostalgia—Pain in one or some of the bones.

Osteo sarcoma—A fleshy, cartilaginous mass, growing within a bone, enlarging and sometimes fracturing it.

Ovariotomy—The art or operation of removing the ovaries from the female animal; spaying—analogous to the gelding of the male.

Ovaries—The organs connected with the uterus that mature and give off the ova (eggs) which, when impregnated, produce the fœtus.

Ovule—The impregnated germ or egg.

Oxidize—The change formed by the action of oxygen, or air containing oxygen, on any substance. The changing of the black or venous blood into red or arterial blood, in the lungs.

Ozœna—Gleet, catarrh.

Pabulum—That which is proper for food.

Palate—The roof of the mouth.

Palpitation—A rapid, thumping movement of the heart, from mental excitement or from disease.

Panacea—A supposed universal cure. A medicine applicable to many cases.

Pancreas—The narrow, flat gland extending across the abdomen, sometimes called the sweet-bread.

Paralysis—An affection impairing or destroying the natural function, and especially the voluntary movement, of a part; in popular usage, the palsy.

Parotid—Near the ear. Parotid gland: the largest of the salivary glands.

Paroxysm—In disease, a recurrence coming on after an intermission. Chills and fever, for example, are paroxysmal.

Parturition—The act of bringing forth young.

Patella—The knee-pan.

Pathology—The science which treats of the causes, nature, symptoms and cure of diseases.

Paunch—The first stomach of ruminating animals.

Pectoral—Pertaining to the breast, as the pectoral muscles. A medicine adapted to relieve affections of the chest and lungs.

Pectin—The gelatinizing principle of certain fruits and vegetables.

Pelvis—That part of the trunk bounding the abdomen, containing a part of the intestines, and the internal urinary and genital organs.

Penis—The exterior male organ of urination, and of the passage of the semen.

Pepsin—A substance assisting digestion.

Peptic—Promoting digestion; relating to digestion.

Pericarditis—Inflammation of the pericardium.

Pericardium—The serous membrane enclosing the heart.

Perichondrium—The membrane covering the cartilages.

Pericranium—The membrane lining the bones of the skull.

Perinæum—The space between the anus and the genital organs.

Periosteum—The fibrous membrane investing a bone.

Peritoneum—The serous membrane lining the cavity of the abdomen.

Peritonitis—Inflammation of the peritoneum.

Permeate—To penetrate every part of, and pass through without rupture or sensible displacement. Water permeates sand; light permeates glass.

Pharynx—The opening or tube at the back part of the mouth which leads to the stomach.

Phlebitis—Inflammation of a vein.

Phlebotomy—The operation or act of bleeding.

Phthisis—Consumption.

Physiology—The science which treats of the functions of the various organs of a living body.

Piles—A disease consisting of chronic dilatation or small tumors of the blood-vessels immediately about the anus, and attended with more or less pain.

Placenta—The membrane covering the young in the womb; the after-birth.

Plethora—A full habit of body; full of blood.

Pleura—The serous membrane lining the interior of the chest, and covering the lungs, which it lubricates with its secretions.

Plexus—Any union of vessels, nerves or fibers in the form of net work.

Pneumonia—Inflammation of the lungs.

Poison—Any substance, animal, vegetable or mineral, which applied externally or taken internally, causes either death or serious hurtful changes. Poisons are classified as irritant, narcotic, sedative, acro-narcotic, and acro-sedative.

Poll-evil—A chronic, suppurating abscess, on the summit of a horse's head, around the attachments of the cervical ligaments.

Polypus—A tumor with narrow base, in the nostrils, uterus, vagina, etc.

Post-mortem—Literally, after death. The examination of a dead body.

Predisposed—Prepared or fitted for beforehand; inclined to; as, being predisposed to disease.

Prepuce—The cutaneous fold covering the glans penis.

Probang— A flexible, knobbed instrument, for pressing into the stomach food or other substance which may have lodged in the throat.

Process—Prominence; a projecting part; any protuberance, eminence or projecting bone.

Profuse—Abundant, plentiful; as, a profuse discharge.

Prognosis—The act or art of judging by the symptoms the probable course of a disease.

Prolapsus uteri—Falling of the womb.

Prolapsus recti—Falling of the rectum.

Proud flesh—A fungous growth on an ulcer, or an excrescence of flesh in a wound from excessive granulation.

Pulmonary—Pertaining to, or affecting, the lungs.

Pulsation—A beating or throbbing of the heart or arteries.

Pulse—The action or beat of the arteries.

Pumices—The letting down or falling of the coffin bone on the sole.

Puncture—Any orifice made with a pointed instrument.

Pupil—The ball or apple of the eye, through which the rays of light pass to the crystalline humors.

Purgative—Any medicine having the power of operating strongly on the bowels.

Pus—The matter discharged from a tumor when lanced, or from sores. Healthy pus is yellowish white in color, and is always secreted in the process of healing.

Putrefaction—The process of decomposition; state of corruption; rottenness.

Pylorus—The lower orifice of the stomach on its right side, through which the food passes to the intestines.

Quack—A pretender in medicine. A charlatan.

Qualmish—Sick at the stomach; suffering from nausea.

Quiescent—At rest. Showing no pain. Making no sound.

Quittor—An ulcerous formation, resembling fistula, inside a horse's foot.

Rabies—Madness; hydrophobia.

Rachitis—Inflammation of the spine; rickets. The latter word is probably a corruption of rachitis.

Ramify—Branched; running in various directions.

Rancid—Having a rank, strong smell; in a state of incipient putrefaction.

Raphe—A seam or suture.

Rash—An eruption of the skin.

Receptacle—That which receives or contains something else.

Rectum—The last intestine. The anal gut.

Reflux—In medicine, the return of the blood from the head, or from towards the extremities to the heart.

Refrigerants—Medicines or lotions to diminish heat.

Regurgitate—To throw or pour back; to swallow again.

Relax—To abate; to become more mild, or less rigorous.

Remittent—Ceasing for a time, as a fever or a pain.

Reproduction—The act or process of reproducing the young; breeding.

Resolvent—A substance or medicine that will scatter inflammatory or other tumors, and prevent their suppuration.

Respiration—The act of breathing.

Respiratory murmur—The murmur which, when the ear or stethoscope is applied to the chest, is heard in the lungs, and attending the act of breathing.

Retention—A stopping or withholding, as retention of the urine.

Retina—The expansion of the optic nerve in the back part of the eye, on which the image is produced, in the act of seeing, or vision.

Repulsion—In physics, that power by which particles or bodies are made to recede from each other.

Reunion—The union of parts separated by a wound or accident.

Rickets—A certain diseased state of the bones in children.

Rigidity—Stiffness; inflexibility.

Ringbone—Exostosis, or formation of bony matter, on the coronet bone and pastern bone of a horse's foot.

Roaring—A disease or constriction of the wind-pipe, producing a roaring noise in the expulsion of the breath.

Rumination—The act or habit of chewing the cud.

Rupture—The act of breaking or bursting, or the state resulting therefrom. The common name for hernia.

Saccharine—Containing, or having the qualities of, sugar.

Sacral—Belonging to the *os sacrum*.

Saline—Containing salt in solution; tasting saltish.

Saliva—The secretion of the salivary glands, which moistens the food in chewing, and also keeps the mouth and tongue moist.

Salivation—An excessive secretion of saliva. White clover will sometimes produce it in horses, or it may be produced by certain medicines, especially calomel.

Sanguine—Full of blood. Abounding with blood.

Sanguinification—The process of producing blood from chyle.

Sanitary—Relating to the preservation of health; tending to health.

Sarcoma—A fleshy tumor.

Saturate—To soak so full of liquid or fumes that no more can be held.

Scab—The incrustation on a sore. A verminous disease of sheep.

Scaphoid—Shaped like a boat, as the navicular bone.

Scapula—The shoulder-blade.

Sclerotic—The thick, hard, white outer coat of the eye.

Sciatica—A rheumatic or neuralgic affection of the hip.

Sear—To burn with a hot iron; actual cautery.

Secretion—The separation of various substances from the blood.

Sedatives—Soothing medicines; remedies to depress nervous power, or lower circulation.

Semen—The male generative product secreted in the testicles.

Senile—Old, or belonging to old age.

Sensorium—The seat of sensation. An organ which receives impressions.

Sensitive—Having feeling. Sensitive lamellæ: lamellæ of the coffin-bone.

Septic—Causing or hastening putrefaction. Antiseptic: arresting putrefaction.

Serum—The yellowish, watery portion of the blood remaining after coagulation.

Seton—An artificial passage made under the skin, by means of a seton needle, and kept open with tape, silk or the like, which is thereby drawn in, and is moved backward and forward daily, to keep up irritation, with a view to reducing inflammation elsewhere.

Shank—The bone of the leg from the knee to the ankle.

Sialogogue—A medicine to promote the flow of saliva.

Sinus—An orifice or canal containing pus or matter.

Skin—The covering of the body, and the organ of touch. It is composed of the scarf skin (*cuticle*), the middle (*reta mucosum*), and the inner or true skin (*derma*).

Slink—To abort; to produce young before the natural time.

Slough (pronounced sluff).—To fall away, separate from, as in disease, or in mortified parts.

Socket—The depression or process in which one organ works on another.

Soporific—A medicine to induce sleep.

Spasm—A sudden involuntary contraction of the muscles; a convulsion.

Spasmodic—Characterized by spasms, as cramping, fits, etc.; recurring at intervals, as colic pains, etc.

Spavin—A swelling in or near some of the joints of a horse's leg. It is of two kinds. Bone spavin is a bony growth (*exostosis*) in the region of the hock. Bog spavin, incorrectly called blood spavin, is situated between the tibia and astragulus.

Spinal—Relating to the spine, or back-bone.

Splint—An excrescence in the shank-bone of a horse. Splint-bone: one of the bones of a horse's leg.

Spleen—A livid colored organ, the office of which is not yet well known.

Spontaneous—Occurring without any apparent cause from without.

Sporadic—Separated, scattered; occurring here and there, as sporadic cases of disease.

Sterile—Barren. Not capable of producing young.

Sternum—The breast-bone, situated in the fore part of the thorax.

Stimulants—Medicines to temporarily excite the nervous or circulatory systems.

Stomachics—Agents to promote digestion.

Strangles—An eruptive fever attended with inflammation and suppuration of the tissue of the upper part of the throat; called in the United States, distemper.

Strangulated—Choked; having the circulation stopped in any part.

Strangury—Stopping of a passage.

Stricture—Stoppage or obstruction of a passage of the body, by morbid or spasmodic action.

Stupor—A dull, sleepy, stupid condition. Loss of sensation.

Styptic—A powerful astringent for restraining or stopping bleeding.

Sudorific—That which will cause perspiration or sweating.

Suppuration—The process of forming pus or matter; the result of inflammation in an abscess or wound.

Suture—A stitch or fastening on joining together. The seam or joint which unites the bones of the skull.

Symmetry—As applied to animals, signifies that they are well proportioned, handsomely and stoutly formed.

Sympathy—The connection existing between two or more organs, by which the diseased condition or abnormal action of one is transmitted, secondarily, to the others.

Symptom—Any circumstance observed to occur constantly in the same form of disease, and serving to point out its true nature and seats; any change occurring in the progress of a disease, indicative of its course and probable determination.

Synovia—A fluid resembling the white of an egg, secreted at the joints and articulations, which it lubricates and keeps in healthful condition. Joint-oil, so called.

Tænia—Literally, fillet or band. The scientific name of the tape-worm.

Tarsus—The cartilage towards the edge of each eyelid, giving it shape and firmness. That part of the human foot with which the leg joins, and whose front is called the instep. The hock-joint of the horse.

Tendon—The dense, fibrous structure in which a muscle ends, and by which it is joined to a bone.

Tent—A pledget or plug introduced into a wound.

Tenuity—The property of being thin, as rarefied air.

Testicle—The male gland containing the seminal fluid.

Tetanus—A disease in which the muscles of voluntary motion are spasmodically but persistently contracted, causing rigidity of the parts affected. When in the face it is called lock-jaw or trismus.

Therapeutics—That part of medicine which relates to the discovery and application of remedies for diseases. The use of diet and medicines.

Thorax—The chest, or that part of the body between the neck and abdomen.

Thorough-pin—A bursal enlargement of the upper and back part of the hock of a horse.

Thrush—Ulceration of the cleft of the frog, and extending over the whole of it, with a discharge of fetid matter.

Tibia—The large bone of the hind leg of the horse, etc.

Tonics—Agents which gradually and permanently improve the system.

Tonsil—An oblong gland situated on each side of the fauces, terminated by the larynx and pharynx, at the rear of the mouth and having excretory ducts opening into the mouth.

Torsion—The act of turning or twisting, as in drawing a tooth with the turnkey.

Trachea—The windpipe.

Tractile—That which may be drawn out.

Transfusion—The introducing of blood from one living being into another.

Tread—Tramping upon, as the tread of one hoof upon the other. The part of the hoof resting on the ground.

Trichina spiralis—A minute entozoön (parasitic mite), which burrows in the muscles, and which, before becoming encysted, sometimes causes the death of the animal. They are principally generated in swine, fowls, rats and other omnivorous feeders.

Tuber—A rounded projection, especially of a bone.

Tubercle—A small tumor, as tubercles in the lungs.

Tumor—A swelling or enlargement, generally applied to those which are permanent.

Tympanum—The drum of the ear.

Ulcer—A running sore.

Ulna—The larger of the two bones of the arm.

Ulterior—Remoter; yet to come; last or final.

Umbilicus—The navel.

Ungulata—Animals having the toes (digits) enclosed in hoofs.

Unciform—Curved or crooked, as a clam or the finger nail.

Ureter—One of the two canals or ducts which convey the urine from the kidneys to the bladder.

Urea—The principal characteristic constituent of urine. It is white, transparent and crystallizable.

Urinary—Pertaining to the urine.

Urine—The saline secretion of the kidneys.

Uterus—The womb.

Vagina—The canal, in female animals, from the vulva to the uterus.

Varicose veins—Veins, most commonly in the legs, which are permanently dilated, knotted and irregular.

Vascular—Pertaining to the vessels of animal and vegetable bodies, as the vascular functions. The arteries, veins, lacteals, and the like, compose the vascular system. Animal flesh is vascular.

Venesection—Letting blood by opening a vein.

Venous—Pertaining to the veins, or contained in the vein.

Ventral—Pertaining to the abdomen or belly.

Ventricose—A swelled appearance, making the object look bellied.

Vermicular—Worm-like in shape or appearance.

Vermifuge—A medicine or agent to kill or expel worms.

Vertebra—A division or separate bone of the spinal column.

Vertex—The top of the head

Vertigo—Dizziness. An indication of plethora, or, frequently, a symptom of some disease.

Vesicle—A small blister. Any membranous cavity.

Veterinarian—One skilled in (and, usually, legally qualified for) the treatment of the diseases of the horse, cattle and other domestic animals.

Veterinary—Pertaining to the diseases of domestic animals, and treatment of the same; connected with the duties or art of the veterinarian.

Villi—Fine, small fibres. Villous: abounding with minute fibres, as the inner mucous membrane of the stomach and intestines, called the villous coat, from its abounding with villi or minute hairs.

Virulent—Dangerous or malignant; as, a virulent type of a disease.

Virus—Contagious or infectious matter.

Viscera—The organs contained in any cavity of the body, particularly of the head, thorax and abdomen.

Viscid—Sticky or tenacious, with a glutinous consistency.

Vision—The act or faculty of seeing; that which is seen.

Vital—Having or containing life. Necessary to life.

Vivify—To bring to a vital state.

Vivisection—The dissection of, or cutting into, living animals.

Volatile—Giving off vapor, or flying off in vapor.

Vulnerary—Plants, lotions, ointments, drugs or other substances useful in the healing of wounds.

Vulva—The outer opening in female animals, of the generative parts.

Wane—To decrease, as in a fever.

Warbles—Small, hard tumors on the back of a horse, from irritation of the saddle. Tumors occasioned by the depositing of the eggs of the gadfly in the backs of horses and cattle.

Warts—Spongy excrescences on various parts of the body.

Wen—A distinctly defined tumor under the skin, seldom hurtful. An encysted tumor.

Whinny—To utter the call of the horse. To neigh.

Windgalls—A distension of the synovial membranes of a horse's fetlock joints.

Withers—The bony crest of the shoulders, in a horse.

Womb—The uterus, or bag in which the young are carried before birth.

Wound—A breach of the skin or flesh. Surgery classifies wounds as contused, incised, punctured or poisoned.

Wry neck—An involuntary fixed position of the head towards one of the shoulders.

Xiphoid—Sword-like. A small cartilage at the bottom of the breast-bone.

Yeasty—Frothy, foamy, spumy; as, yeasty pus or matter.

Zeine—The gluten of maize.

Zoölogy—That part of natural history which treats of the structure, habits, classification and habitations of animals.

Zoön—An animal; having animal life.

Zoötomy—Dissection of the lower animal.

Zygoma—The cheek-bone.

Zygomatic—Pertaining to the cheek-bone, or to the bony arch under which the temporal muscle passes.

Zymotic—Caused by, or pertaining to, fermentation; as, a zymotic disease, being one in which some morbific principle acts on the system like a ferment.

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